MX Frame

15000 RT
20000 RT

Pulsar Series

Installation and user manual

Powering Business Worldwide

Thank you for selecting an EATON product to protect your electrical equipment.

The **MX** range has been designed with the utmost care.
We recommended that you take the time to read this manual to take full advantage of the many features of your **UPS** (**U**ninterruptible **P**ower **S**ystem)

Warning: this is a class A UPS product. In a domestic environment, this product may cause radio interference, in wich case, the user may be required to take additional measures.
Output cables should not be longer than 10 meters.
If the device must be installed in overvoltage category III or IV envoronments, additional upstream overvoltage protection must be provided for.

Before installing **MX**, please read the booklet on the required safety instructions. Then follow the indications in this manual.

To discover the entire range of EATON products and the options available for the **MX** range, we invite you to visit our web site at www.eaton.com or contact your EATON representative.

Environmental protection

EATON has implemented an environmental-protection policy.
Products are developed according to an eco-design approach.

Substances

This product does not contain CFCs, HCFCs or asbestos.

Packing

To improve waste treatment and facilitate recycling, separate the various packing components.
- The cardboard we use comprises over 50% of recycled cardboard.
- Sacks and bags are made of polyethylene.
- Packing materials are recyclable and bear the appropriate identification symbol

.

Material	Abbreviation	Symbol number
Polyethylene terephthalate	PET	01
High-density polyethylene	HDPE	02
Polyvinyl chloride	PVC	03
Low-density polyethylene	LDPE	04
Polypropylene	PP	05
Polystyrene	PS	06

Follow all local regulations for the disposal of packing materials.

End of life

EATON will process products at the end of their service life in compliance with local regulations.
EATON works with companies in charge of collecting and eliminating our products at the end of their service life.

- **Product**

The product is made up of recyclable materials.
Dismantling and destruction must take place in compliance with all local regulations concerning waste.
At the end of its service life, the product must be transported to a processing centre for electrical and electronic waste.

- **Battery**

The product contains lead-acid batteries that must be processed according to applicable local regulations concerning batteries.
The battery may be removed to comply with regulations and in view of correct disposal.

Introduction

Pictograms

Important instructions that must always be followed.

Information, advice, help.

Visual indication.

Action.

Audio signal.

In the illustrations on the following pages, the symbols below are used:

LED off

LED on

Contents

1. Presentation

1.1 Wheels position 8

1.2 Rack position 8

1.3 Sub-modules 8

1.4 Rear panels 9

MX Frame 15000 RT / 20000 RT 9

1.5 Display and control panel 10

Sub-module pictograms on display 10

1.6 Battery extension 11

Battery extensions for MX Frame 11

MX EXB RT (optional battery module) 11

Battery Integration System 11

Battery extension cable (1,8 m / 6 ft) 11

2. Installation

2.1 Unpacking and contents check 12

Unpacking 12

Contents check 12

2.2 Rack mounting 13

Wheels removal 13

Rack mounting kit 13

UPS module rack mounting 14

2.3 Mounting sub-modules 15

2.4 Communication ports 16

Connection to the RS 232 communication port 16

Connection to the communication port by relays 16

Installation of communication card 17

Remote Power Off communication port 17

2.5 Required protective devices and cable cross-sections 18

Recommended upstream protection 18

Recommended downstream protection 18

Required cable cross-sections 18

2.6 Installation depending on the system earthing arrangement (SEA) 19

Single phase input 19

UPS with common Normal and Bypass AC inputs 19

UPS with separate Normal and Bypass AC inputs 19

UPS with separate Normal and Bypass AC inputs, supplied by separate sources 20

Frequency converter (without Bypass AC input) 20

Three phases input 21

UPS with common Normal and Bypass AC inputs 21

UPS with separate Normal and Bypass AC inputs 21

UPS with separate Normal and Bypass AC inputs, supplied by separate sources 22

Frequency converter (without Bypass AC input) 22

Contents

2.7 Connections of input/output power cables 23
Input connection 23
Access to terminal block 23
Single phase input 24
Common sources 24
Separate sources 24
Three phases input 25
Common sources 25
Separate sources 25
2.8 Fix the terminal block cover 26
2.9 Extended battery (EXB) connections 27
2.10 Connection of IEC cables to output receptacles 27

3. Operation

3.1 Initial start-up 28
3.2 Final start-up sequence 28
3.3 Operating modes 29
Normal mode 29
Battery mode 29
3.4 Return on Normal AC source 29
3.5 UPS shutdown 30

4. Access to measurements and personalisation data

4.1 Display organisation 31
4.2 Access to measurements 31
4.3 Access to UPS set-up and maintenance 31
4.4 UPS set-up 32
Local settings 32
Output settings 32
ON/OFF settings 32
Battery settings 33
4.5 Maintenance 33
4.6 Personalisation using external software 33

5. Troubleshooting

5.1 Troubleshooting LEDs 34
5.2 System diagnosis fault 35
Start with xUPS 35
No start 35
5.3 Environment faults 36
5.4 Internal faults 37

Contents

6. Life Cycle Monitoring (LCM)

6.1 Description 38

Get free offers 38

Secure your installation power continuity 38

Reset or disable LCM 39

7. Maintenance

7.1 Hot swapping the power sub-module 40

Disconnecting the power sub-module : 40

Reconnecting the power sub-module : 40

7.2 Hot swapping the battery sub-module 40

Disconnecting the battery sub-module : 40

Reconnecting the battery sub-module : 40

7.3 Service position (bypass position) 41

7.4 Normal position (online mode) 42

7.5 Training centre 43

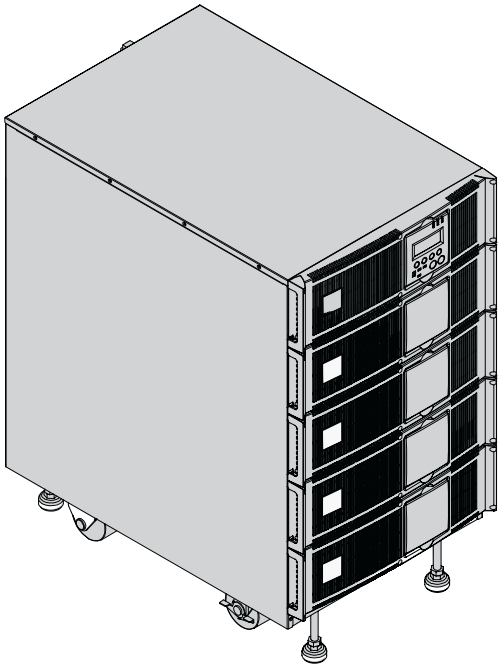
8. Appendices

8.1 Technical specifications 44

8.2 Glossary 45

1. Presentation

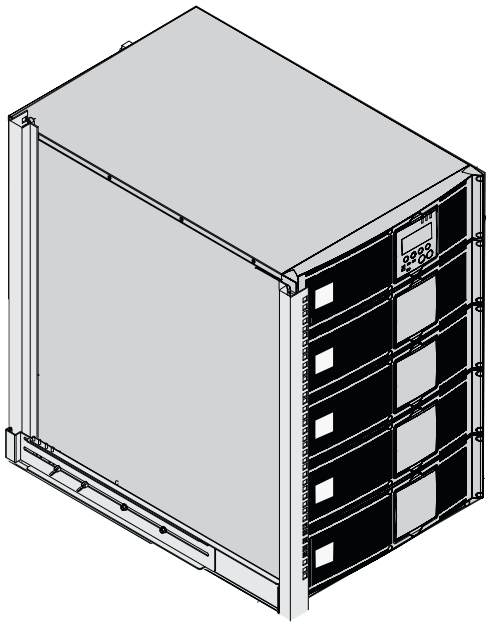
Wheels position



Dimensions (H x W x D)	
MX Frame 15 000 RT/ 20 000 RT (on wheels)	688x445x738 mm 27 x 18 x 29 inches

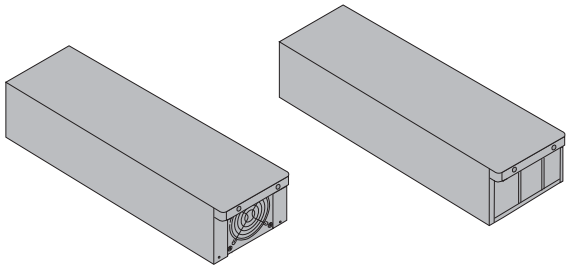
Weights	
MX Frame	71 kg 157 lbs
MX Frame 15 000 RT	194 kg 428 lbs
MX Frame 20 000 RT	239 kg 527 lbs

Rack position



Dimensions (H x W x D)	
MX Frame 15 000 RT/ 20 000 RT (wheels removed)	688x445x738 mm 27 x 18 x 29 inches

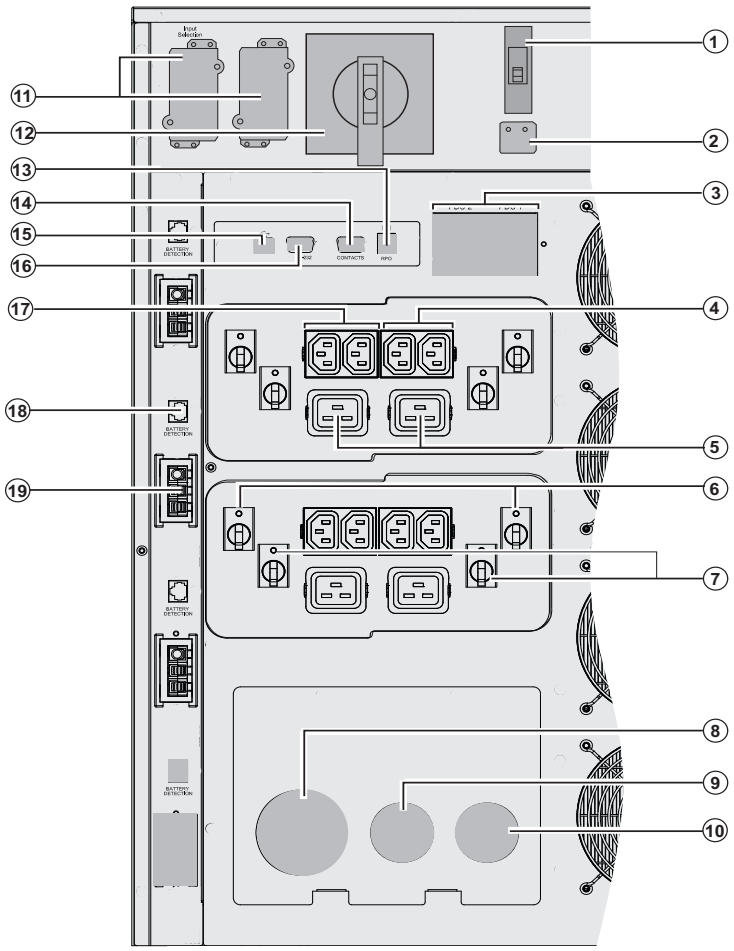
Sub-modules



Weights	
MX Frame Power sub-module	12 kg 26 lbs
MX Frame Battery sub-module	30 kg 65 lbs

Rear panels

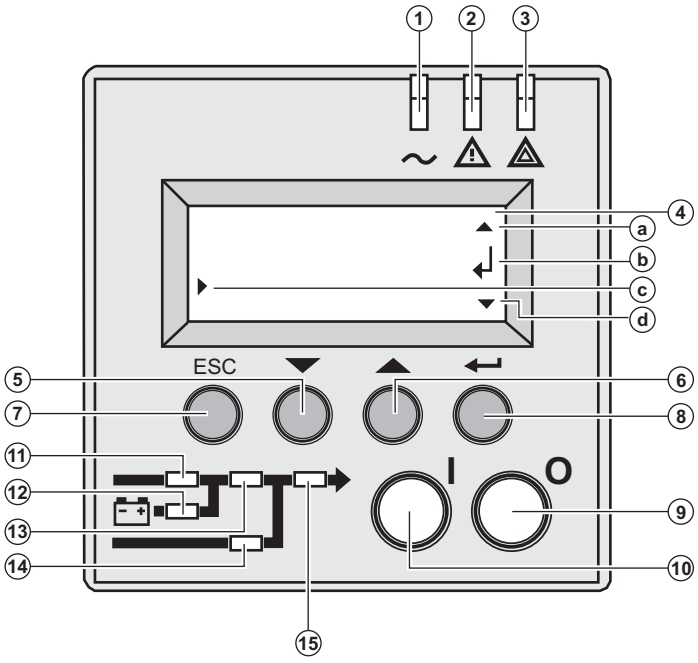
MX Frame 15000 RT / 20000 RT



(1) Normal AC source input switch
(2) Single phase or three-phase input selection
(3) Residual-current earth-leakage circuit breaker 30mA for PDU1 and PDU2
(4) Groups of 2 (10A) outlets for connection of equipment
(5) Groups of 2 (16A) outlets for connection of equipment
(6) 10A thermal switch
(7) 15A thermal switch
(8) Normal AC source terminal block
(9) Bypass AC source terminal block
(10) Output terminal block
(11) Slot for optional communication card
(12) Manual Bypass switch
(13) Remote Power Off communication port (RPO).
(14) Communication port by relay
(15) USB communication port
(16) RS232 communication port
(17) Two groups of 2 programmable (10A) outlets for connection of equipment
(18) Connector for automatic detection of battery module(s)
(19) Connector for additional battery module

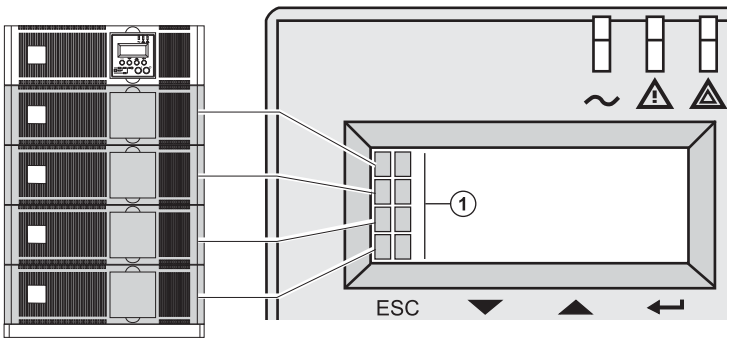
1. Presentation

Display and control panel



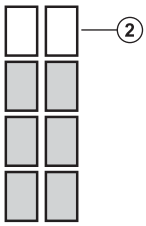
(1) Load protected LED
(2) Downgraded operation LED
(3) Load not protected LED
(4) Alphanumeric display
(a) Upper line exists, access by **(6)**
(b) Lower menu exists, access by **(8)**
(c) Active line
(d) Lower line exists, access by **(5)**
(5) (6) Function buttons (scroll down / scroll up)
(7) Escape (cancel) button
(8) Enter (confirm) button
(9) UPS OFF button
(10) UPS ON button
(11) Rectifier LED
(12) Battery LED
(13) Inverter LED
(14) Bypass LED
(15) Load powered LED

Sub-module pictograms on display

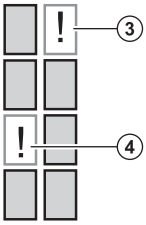


(1) Sub-modules detection

(



(2) The power sub-module and the battery sub-module are not detected on the level (**MX Frame 15000 RT**)



(3) Internal battery sub-module fault detected

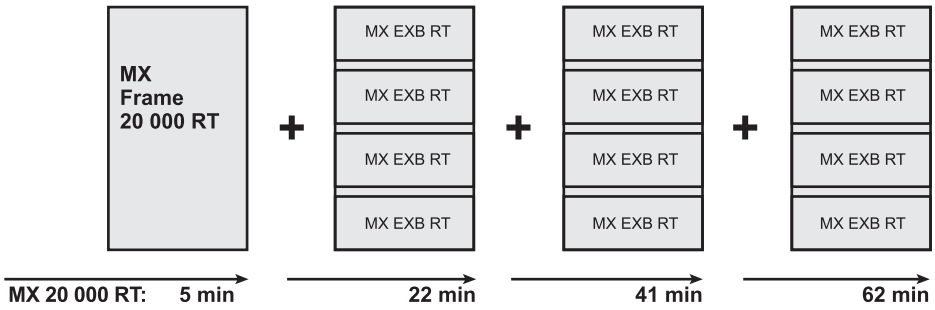
(4) Internal power sub-module fault detected

For internal sub-module fault description, see section 5.2, page 35

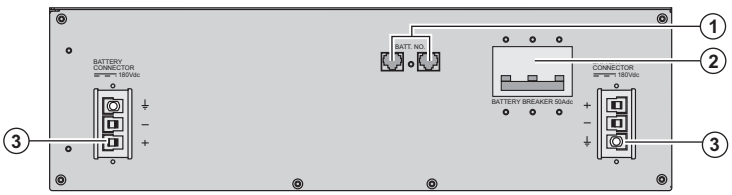
Battery extension

MX Frame offers a standard backup time of 5 minutes at full load.
To increase backup time up to 62 minutes (at full load), it is possible to connect **MX EXB RT** modules to the UPSs.

Battery extensions for MX Frame

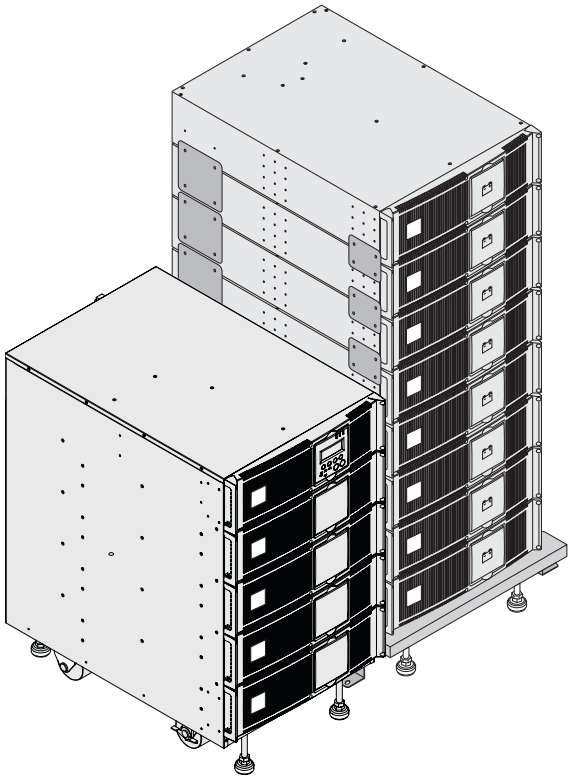


MX EXB RT (optional battery module)



(1) Connectors for automatic detection of battery module(s)
(2) Battery circuit breaker
(3) Connectors for battery modules (to the UPS or to the other battery modules)

Battery Integration System



The Battery Integration System is intended for extended backup time configurations to conveniently stack and secure up to 8 modules on the same cart (swivel wheels with brakes, leveling feet, seismic side panels, plates to lock modules and screws included).

Battery extension cable (1,8 m / 6 ft)

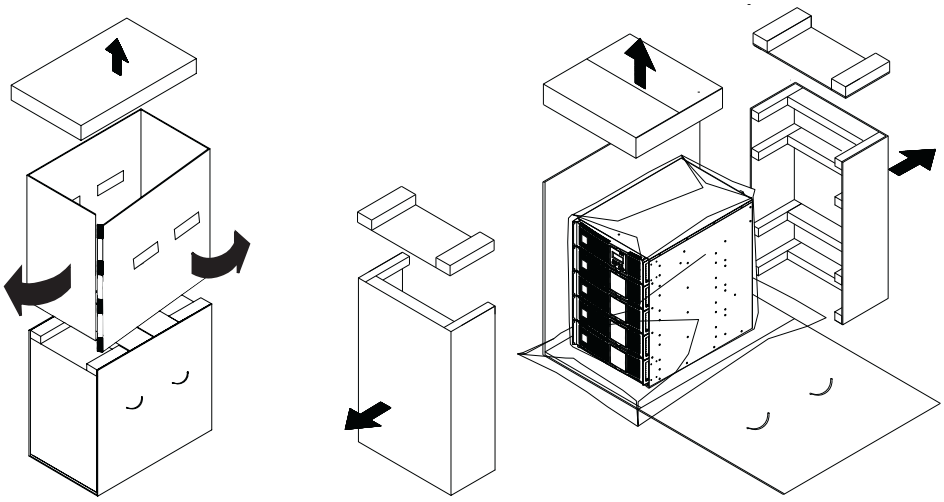
This extended battery cable will be used instead of the standard battery cable when battery modules are distant from each other (located in two different enclosures, for instance).

2. Installation

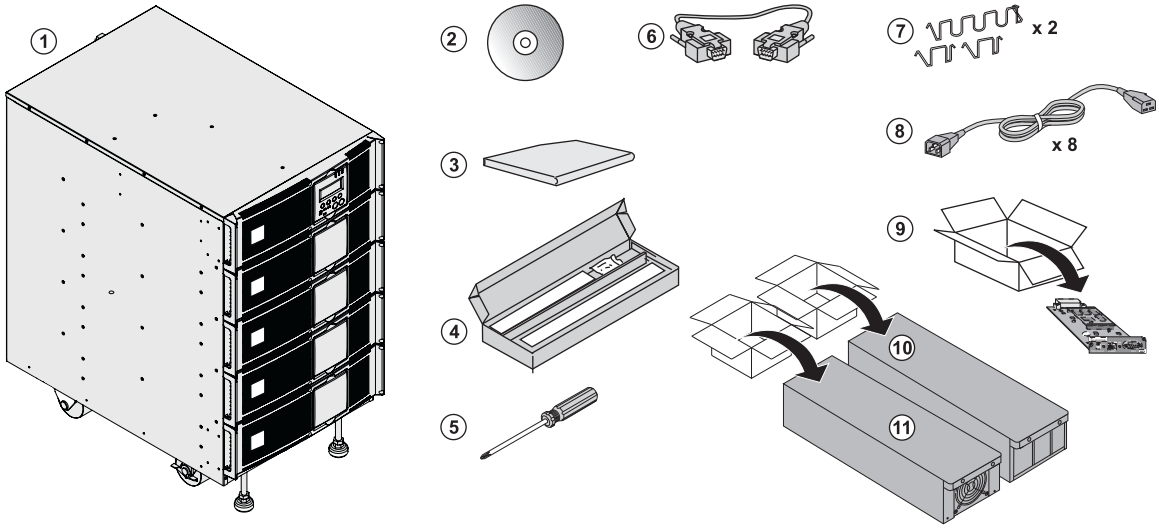
Unpacking and contents check

Unpacking

Keep the packaging parts for wheels removal.



Contents check



(1) MX FRAME 15 000 RT or **20 000 RT** UPS.

(2) Solution-Pac power management suite CD-ROM.

(3) Product documentation.

(4) Rack mounting kit

(5) Screw driver.

(6) RS232 communications cable

(7) 4 cable lockers.

(8) 8 IEC 10A output cables.

(9) Network Management card

(10) 3 or 4 Battery sub-modules (3 for **15 000 RT**, 4 for **20 000 RT)**

(11) 3 or 4 Power sub-modules (3 for **15 000 RT**, 4 for **20 000 RT)**

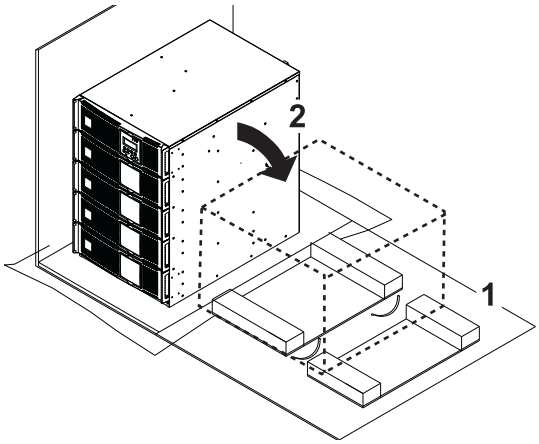
Packaging must be destroyed according to waste management standards. Recycling icons are displayed for easy selection.

A dangerous voltage is present inside the power module and the battery module. Any operations to be carried out on these modules must be done so by qualified staff.

Rack mounting

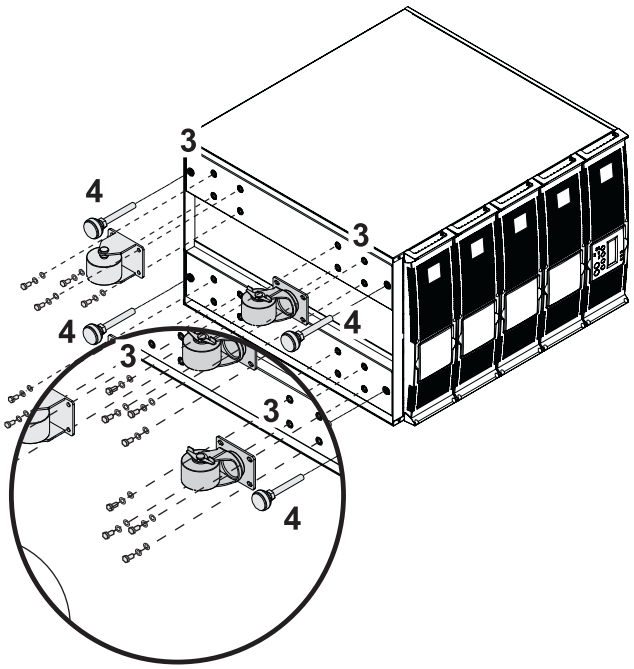
Wheels removal

The battery sub-modules and power sub-modules must no be mounted yet.
It is not allowed to install the UPS or battery module in a hermetically closed environment without any exchange of air.



1 - Use packaging as shown.

2 - Place **MX Frame** on its side.

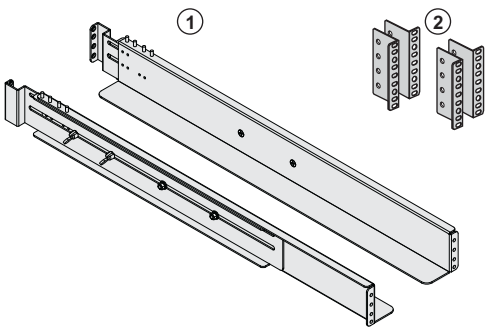


3 - Remove the 4 screws of the 4 wheels.

4 - Remove the feet

Rack mounting kit

Rack mounting kit content (19" enclosure)



(1) Telescopic rails, 639 mm to 1005 mm length (27.36'' to 39.96'')

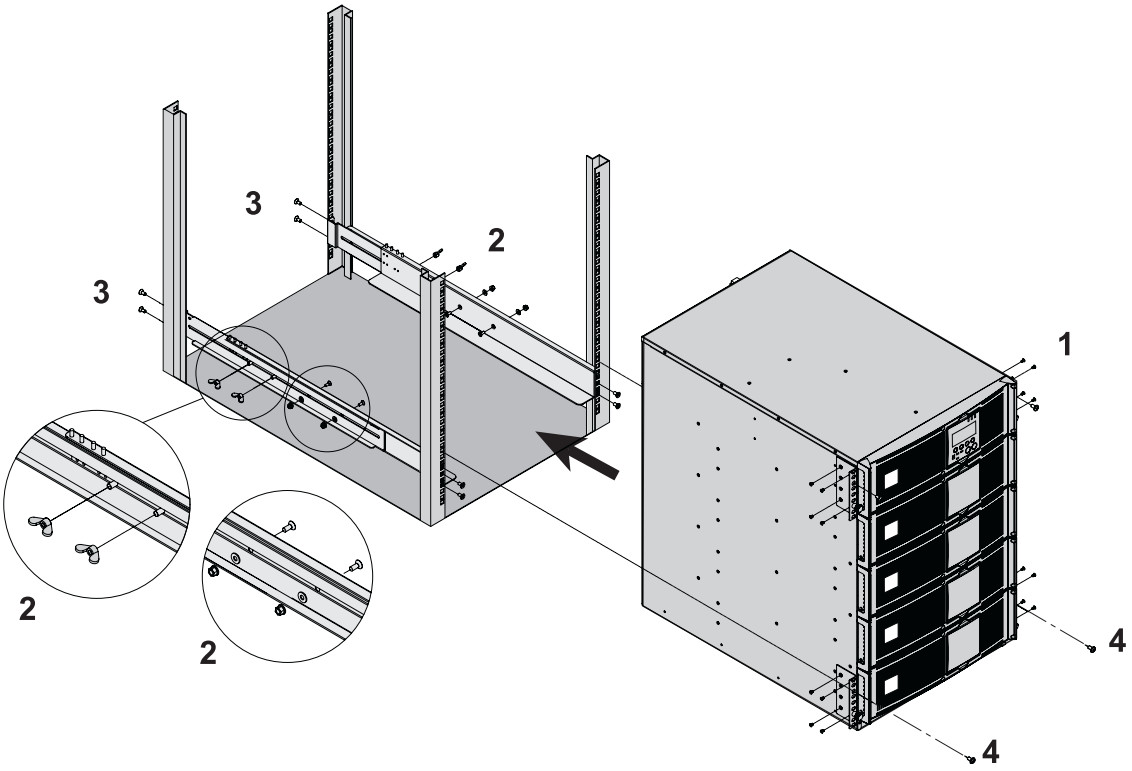
(2) Front mouting brackets

2. Installation

UPS module rack mounting

The battery sub-modules and power sub-modules must no be mounted yet.
It is not allowed to install the UPS or battery module in a hermetically closed environment without any exchange of air.

Follow steps 1 to 4 for rack mounting the UPS onto the rails.



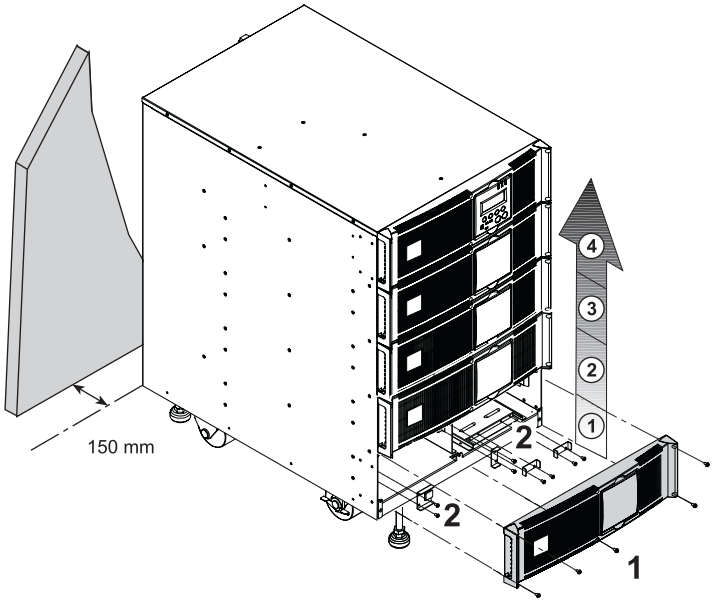
The rails and the necessary mounting hardware are supplied by EATON.

Note for step 1: it is possible to adjust the position of both front mounting ears.

Mounting sub-modules

A dangerous voltage is present inside the power module and the battery module. Any operations to be carried out on these modules must be done by qualified staff.

You must mount the modules from the lowest level to the highest level.
All the sub-modules must be mounted.



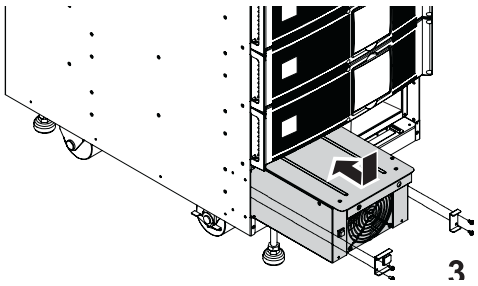
Always keep 150 mm free space behind the UPS rear panel.

1 - Remove the 6 fixing screws to free the front panel as shown.

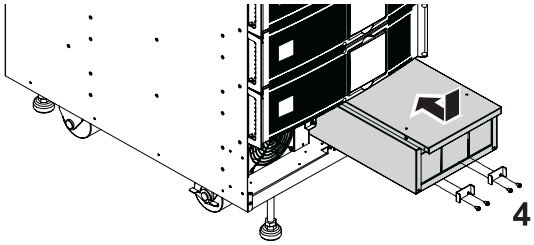
Modules must be mounted from the lowest level (1) to the highest level (4).

2 - Remove the 4 fixing screws of the mounting screws to free the power sub-module space.

Repeat the operation 2 for the battery sub-module space.

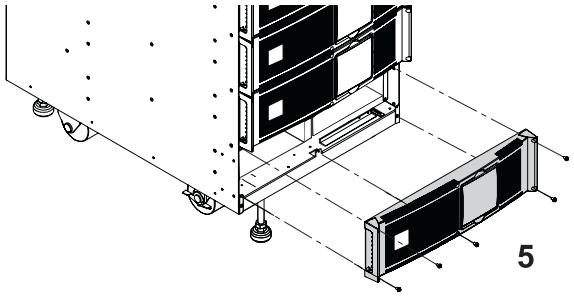


3 - Insert the power sub-module and attach the 4 mounting screws on each side of the power sub-module.



Caution! the battery is heavy: approx. 30 kg/65 lbs

4 - Insert the battery sub-module and attach the 4 mounting screws on each side of the battery sub-module.



5 - Reattach the front panel.

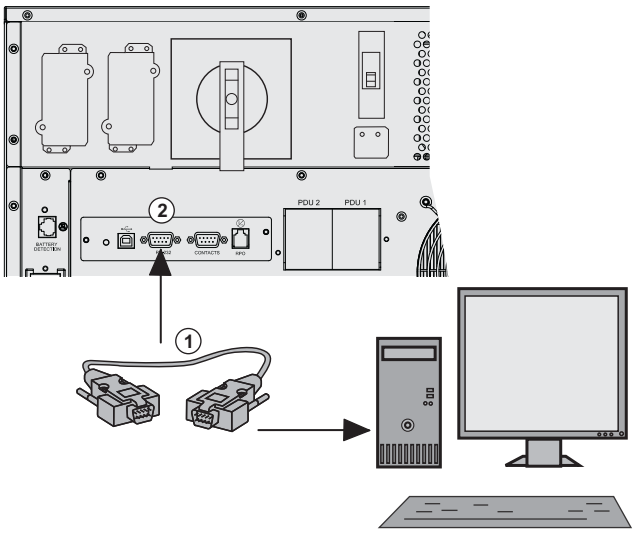
Caution: a battery can cause electrocution and high short circuit currents.
Do not dispose of batteries in a fire. The battery may explode
Do no open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

2. Installation

Communication ports

MX RT provides 3 communication methods that can be used simultaneously:
- 2 COM ports provide RS232 or USB communications using EATON SHUT protocol. Compatible with most power management software applications available into the enclosed **Solution Pac** CD-Rom. Please, note that both ports cannot be used at the same time.
- The output contact port is used for basic signaling or for protection of IT systems like IBM iSeries (formerly AS400) and more.
- The two slots are compatible with any EATON communication card (check **www.eaton.com** web site for the complete list of compatible cards).

Connection to the RS 232 communication port

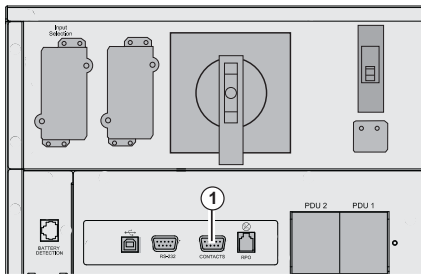


1 - Connect the RS232 **(1)** communications cable to the serial port on the computer equipment.

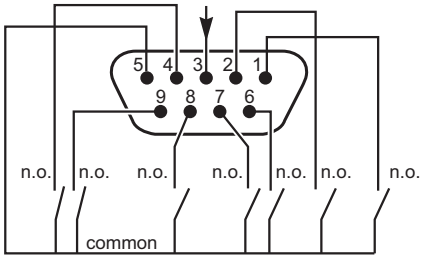
2 - Connect the other end of the communication cable **(1)** to the RS232 **(2)** communications port on the UPS.

The **UPS** can now communicate with various EATON power management application software. Please note that the configuration software is included with **Personal Solution Pac** for Windows.

Connection to the communication port by relays



(1) Communication port by relay



n.o. : contact normally open

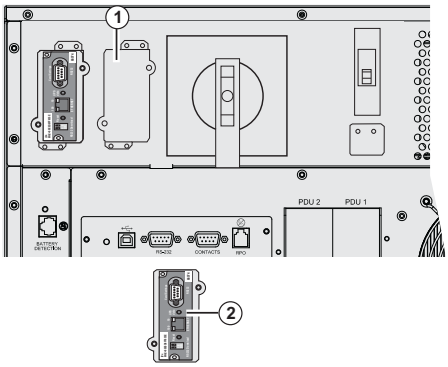
- Pin 1: major alarm
- Pin 2: battery fault
- Pin 3: remote shutdown from external power (5 to 27 V DC/10 mA max).
- Pin 4: normal operation, not on battery, contact (48 V DC/2 A max)
- Pin 5: common
- Pin 6: operation on bypass,
- Pin 7: low battery warning
- Pin 8: load powered
- Pin 9: operation on battery

When the status is active, the contact between the common (Pin 5) and the relevant information pin is closed.

Output relays specifications
- Voltage: 48 V DC max,
- Current: 2 A max,
- Power: 62.5 VA, 30 W.

Example: for 48 V DC, Imax=625 mA

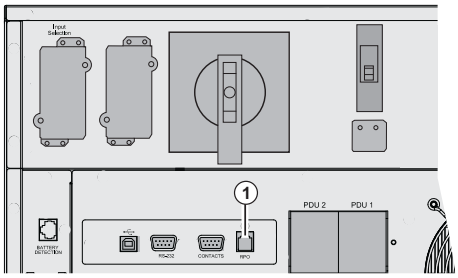
Installation of communication card



It is not necessary to shutdown the UPS before installing a communications card.

1 - Remove the slot cover **(1)** secured by two screws.
2 - Insert the communication card **(2)** in the slot.
3 - Secure the card with both screws.

Remote Power Off communication port



(1) Remote Power Off communication port (RPO).

Installation of a Remote Power Off function must be carried out in compliance with applicable regulations.
In order to fully de-energize devices and **MX Frame** with the RPO port, it is necessary:

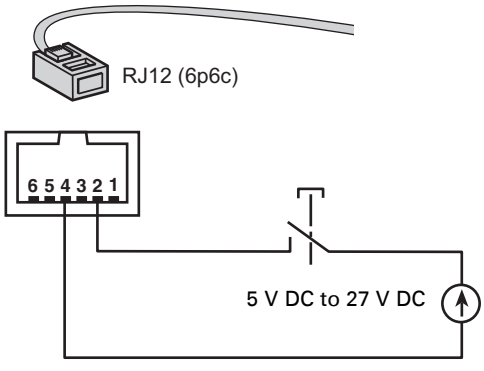
- to use a two-position switch (Normally Open or Closed contact should be held more than 1 second to be taken into account).
- to connect to this RPO switch a device that allows to trip all breaker(s) located upstream(1) and downstream(2) **MX RT**. This can be achieved by means of a shunt trip.

(1) : If not, the output devices could be powered again through static switch when the two-position switch is released.
(2) : If not, the output devices will remain powered several seconds after the RPO activation.

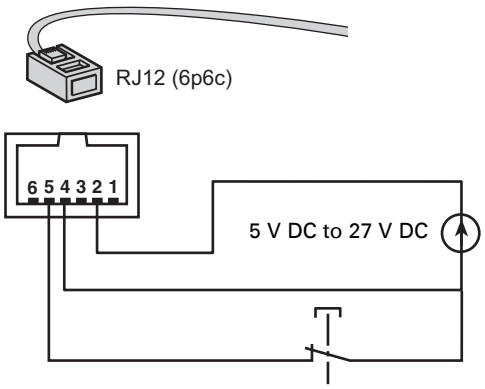
Please, notice that the internal batteries will remain connected to the power sub-module after RPO activation.

The cable is not included.

Remote power off contact normally open



Remote power off contact normally closed



- Signal:
  - activation voltage: 5 V DC to 27 V DC.
  - current: 10 mA max.

2. Installation

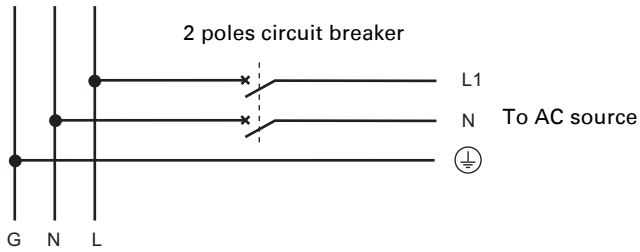
Required protective devices and cable cross-sections

Recommended upstream protection

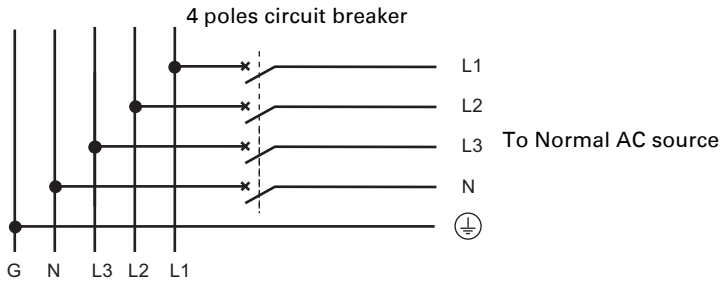
UPS power rating	Upstream circuit breaker
15000/20000 RT	D curve - 125 A

The indicated protection ensures discrimination for each output circuit downstream of the UPS.
If these recommendations are not followed, protection discrimination is not achieved and may result in a potential power interruption to the connected devices.

Single phase input : To UPS Normal AC source and/or Bypass AC source
Three phases input : To Bypass AC source



Three phases input : To Normal AC source



Recommended downstream protection

UPS power rating	Downstream circuit breaker
15000 RT	Z curve - 10A
	C curve - 6A
20000 RT	Z curve - 10A
	C curve - 6A

The indicated protection ensures discrimination for each output circuit downstream of the UPS.
If these recommendations are not followed, protection discrimination is not achieved and may result in a potential power interruption to the connected devices.

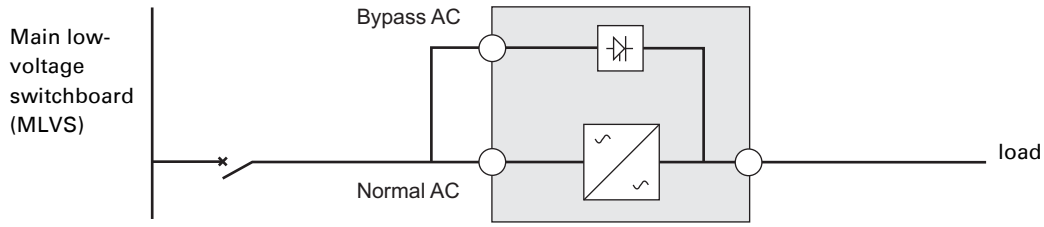
Required cable cross-sections

- Terminal-block cable capacity: 25 mm^2, solid or stranded wire (maximum 25 mm^2 or AWG 2).
- Capacity for earthing conductor: 25 mm^2, solid or stranded wire (maximum 25 mm^2 or AWG 2).

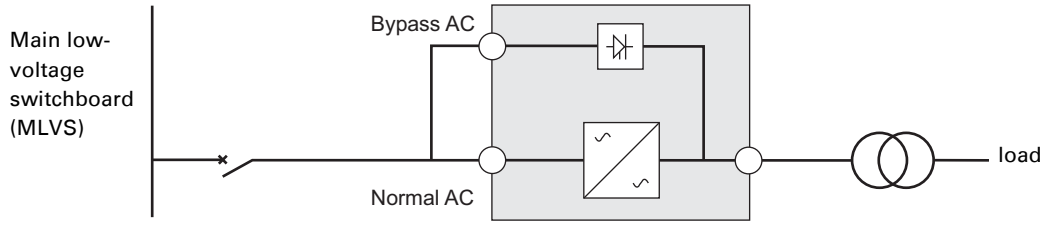
Installation depending on the system earthing arrangement (SEA)

Single phase input

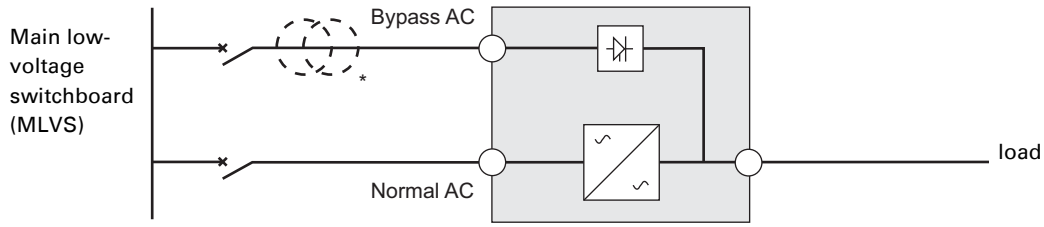
UPS with common Normal and Bypass AC inputs



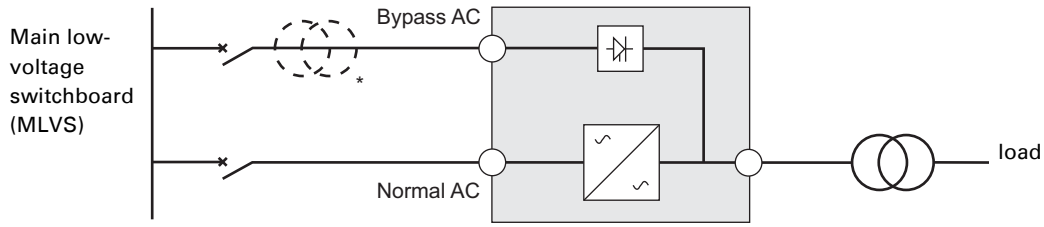
Change in SEA between upstream and downstream or galvanic isolation required



UPS with separate Normal and Bypass AC inputs



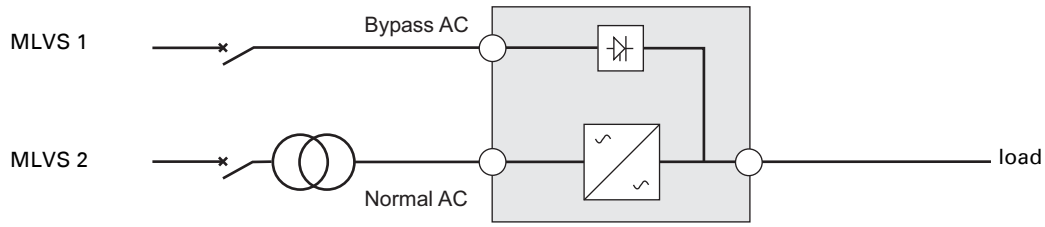
Change in SEA between upstream and downstream or galvanic isolation required

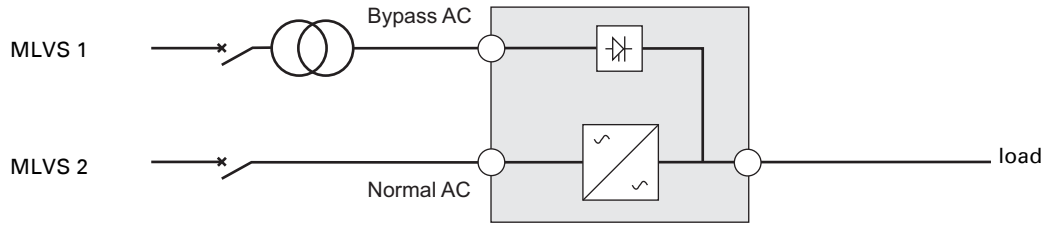


* The transformer is not necessary if:
Normal and Bypass AC inputs are connected to the same source,
and wires cross sections and wires lengths on Normal and Bypass inputs are identical,
and upstream protection is provided by only one switch with RCD (residual current device) for Normal and Bypass inputs.

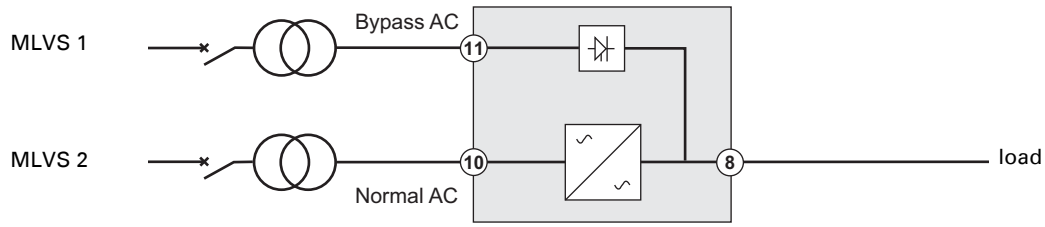
2. Installation

UPS with separate Normal and Bypass AC inputs, supplied by separate sources



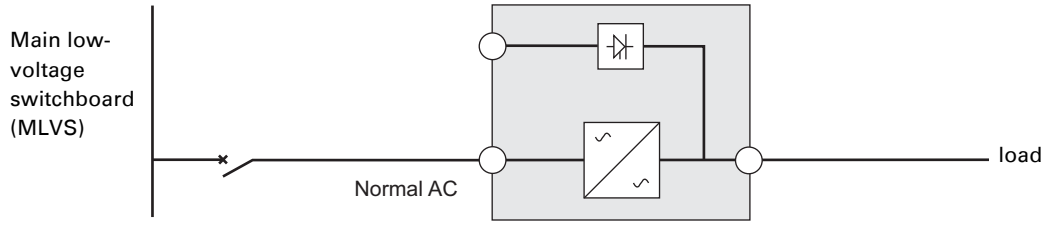


Change in SEA between upstream and downstream or galvanic isolation required



Frequency converter (without Bypass AC input)

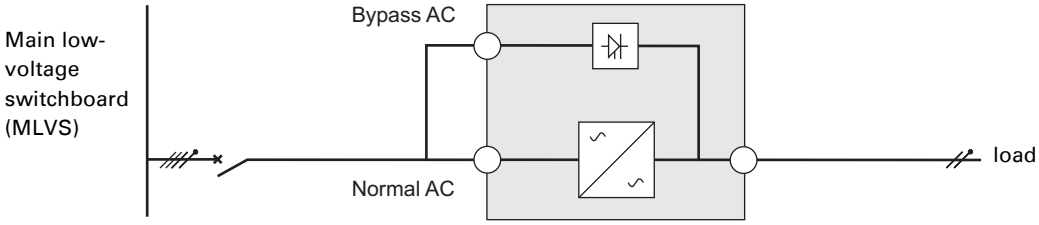
Configuration used when the frequency of the application differs from the Mains (Example : marine requirements).



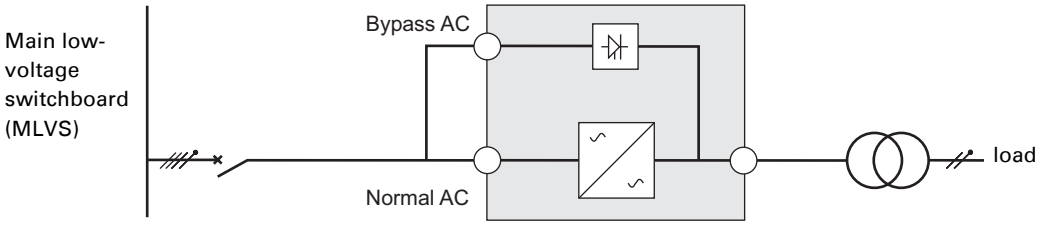
Three phases input

MX Frame must be fed from a 3-phase source with neutral.

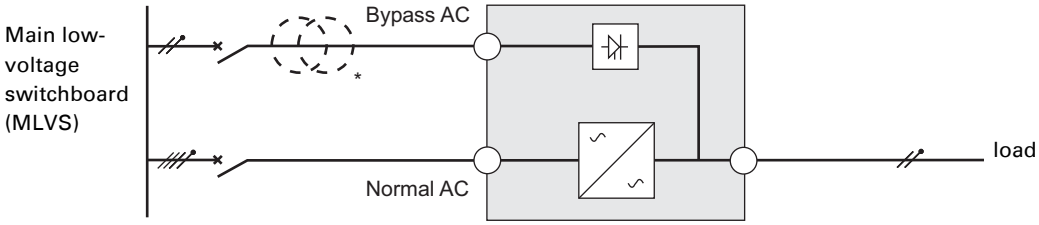
UPS with common Normal and Bypass AC inputs



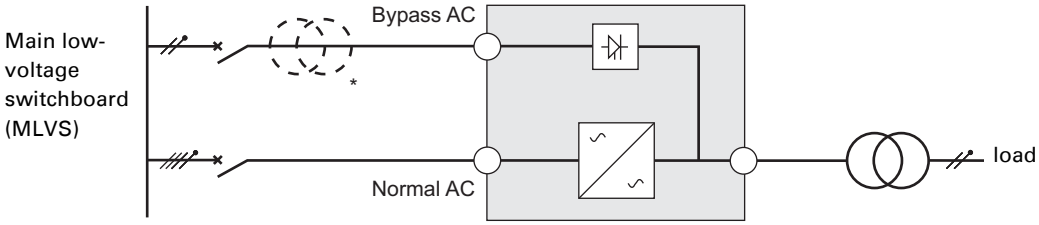
Change in SEA between upstream and downstream or galvanic isolation required



UPS with separate Normal and Bypass AC inputs



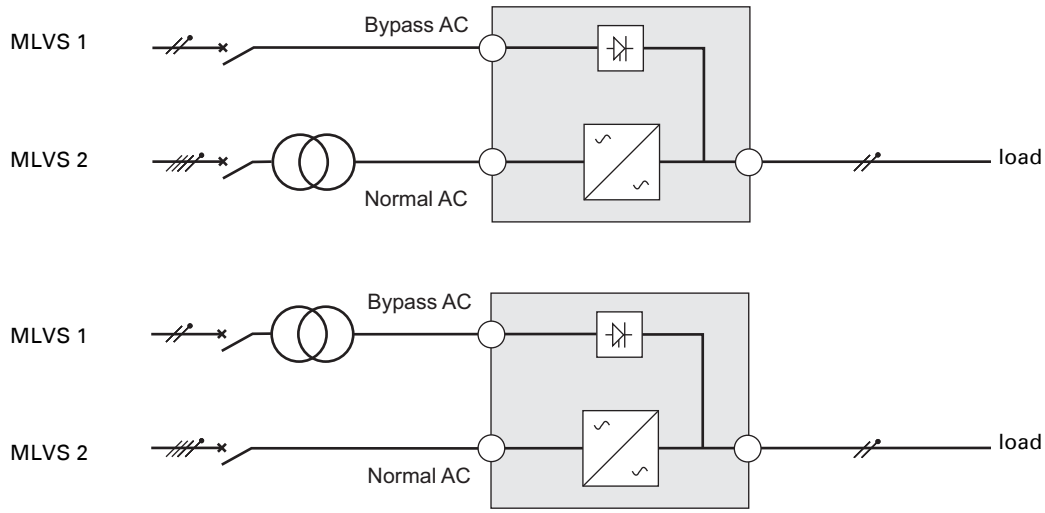
Change in SEA between upstream and downstream or galvanic isolation required



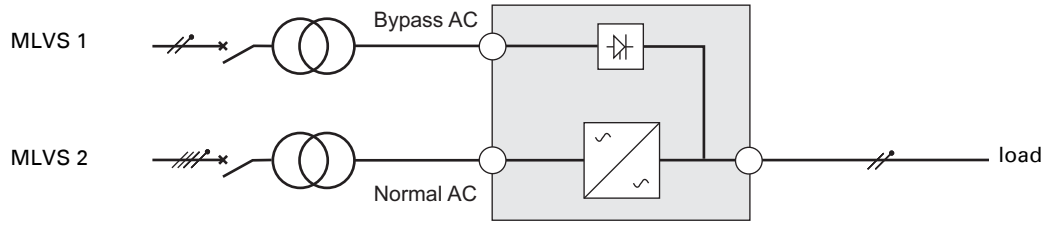
* The transformer is not necessary if:
Normal and Bypass AC inputs are connected to the same source,
and wires cross sections and wires lengths on Normal and Bypass inputs are identical,
and upstream protection is provided by only one switch with RCD (residual current device) for Normal and Bypass inputs.

2. Installation

UPS with separate Normal and Bypass AC inputs, supplied by separate sources

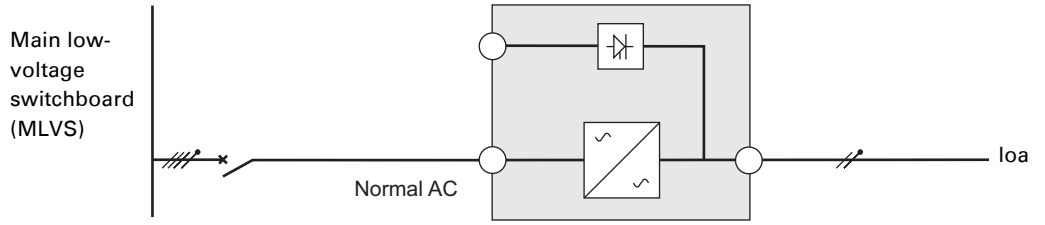


Change in SEA between upstream and downstream or galvanic isolation required



Frequency converter (without Bypass AC input)

Configuration used when the frequency of the application differs from the Mains (Example : marine requirements).



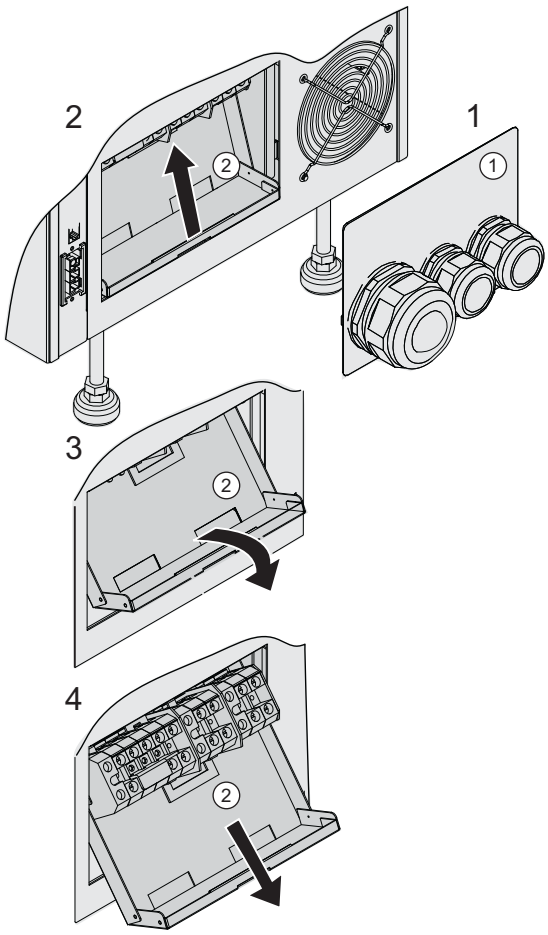
Connections of input/output power cables

This type of connection must be carried out by qualified electrical personnel

Before carrying out any connection, check that the upstream protection device Normal AC source is open ("O") (OFF)

Input connection

Access to terminal block



1 - Remove the 2 screws of the terminal block cover (1).

2 - Pull up the moving tray (2).

3 - Pull out the moving tray (2).

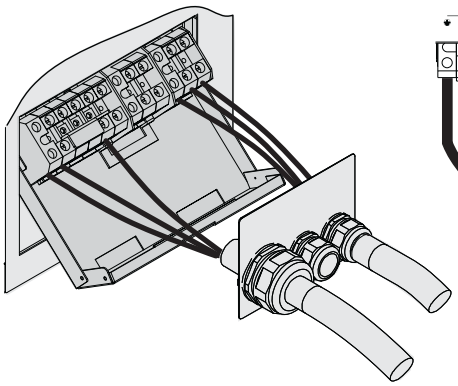
4 - Pull down the moving tray (2).

2. Installation

Single phase input

This type of connection must be carried out by qualified electrical personnel

Common sources

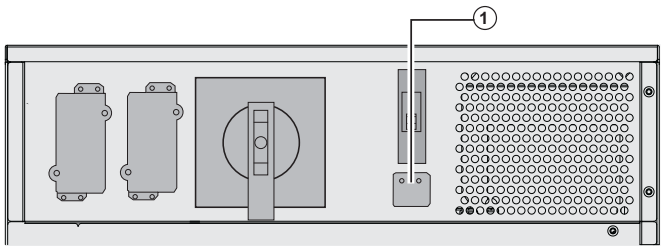


1 - Be sure that the one-phase metal strap is installed

2 - Be sure that the metal jumper is installed

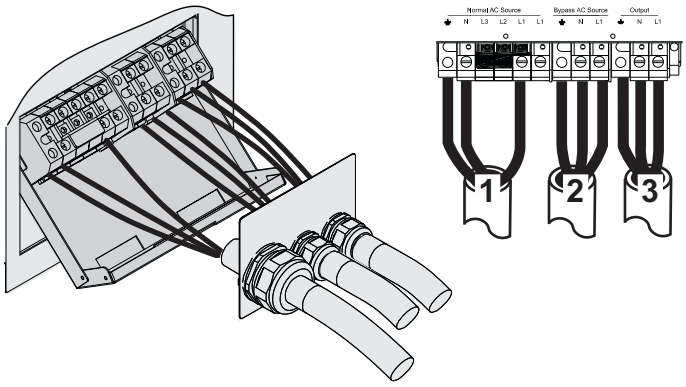
3 - Connect the 3 cables to the normal AC source terminal block

4 - Connect the 3 cables to the output terminal block



5 - Be sure that input selection selector **(1)** is set to single phase position.

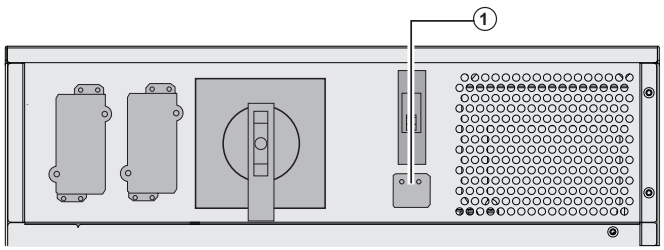
Separate sources



1 - Be sure that the one-phase metal strap is installed

2 - Connect the 3 cables to the normal AC terminal block

3 - Connect the 3 cables to the output terminal block

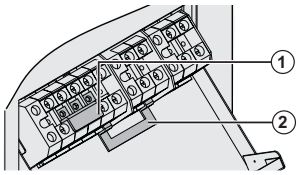


4 - Be sure that single phase or three-phase switch selection **(1)** is set to single phase position.

Three phases input

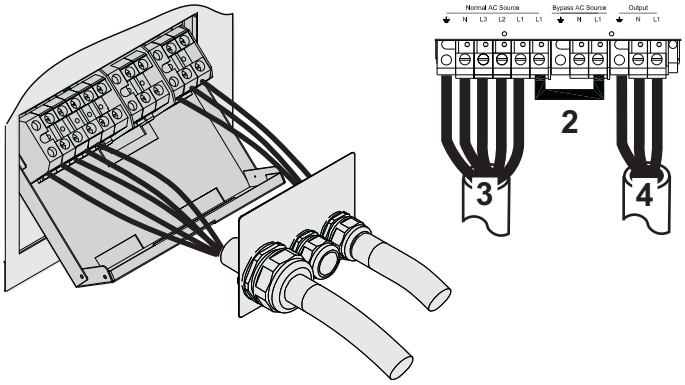
This type of connection must be carried out by qualified electrical personnel

Common sources



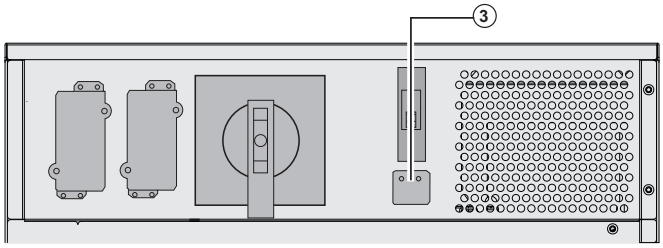
1 - Remove the one-phase metal strap (1)

2 - Be sure that the metal jumper (2) is installed



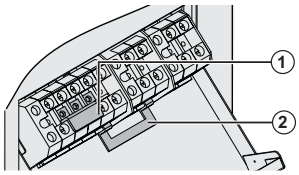
3 - Connect the 5 cables to the normal AC source terminal block

4 - Connect the 3 cables to the output terminal block



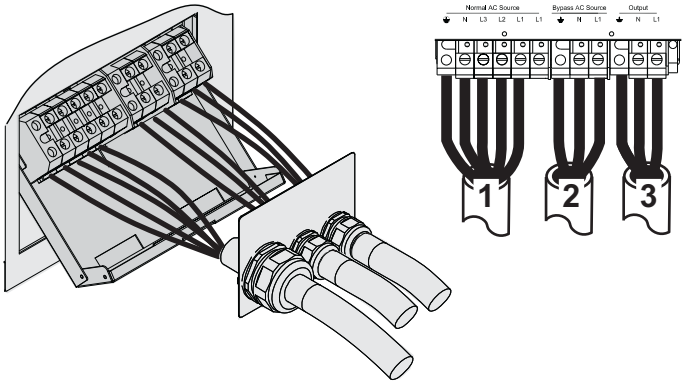
5 - Remove cover and put input selection selector **(3)** to three phase position.

Separate sources



1 - Remove the one-phase metal strap (1)

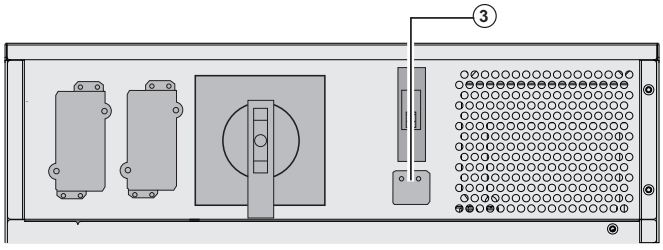
2 - Remove the metal jumper (2)



3 - Connect the 5 cables to the normal AC source terminal block

4 - Connect the 3 cables to the bypass AC source terminal block

5 - Connect the 3 cables to the output terminal block

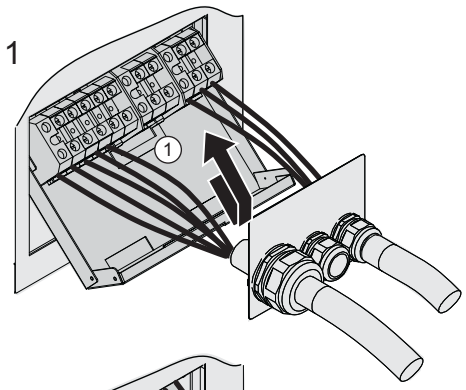


5 - Remove cover and put single phase or three-phase switch selection **(3)** to three-phase position.

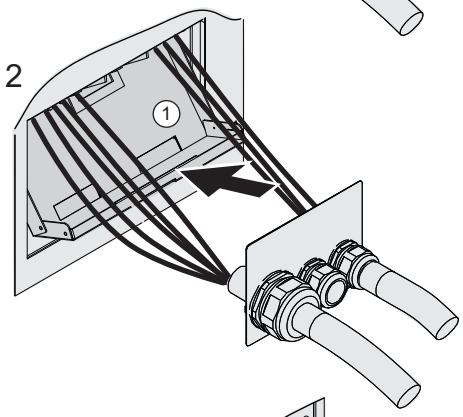
2. Installation

Fix the terminal block cover

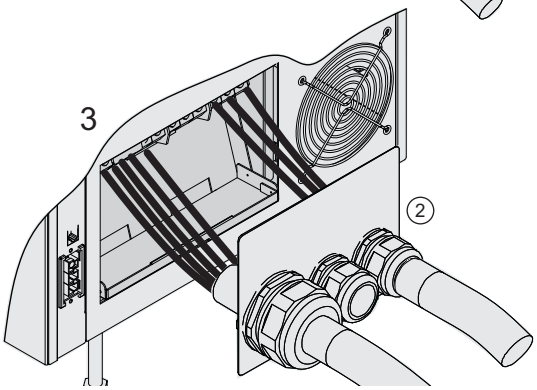
This type of connection must be carried out by qualified electrical personnel



1 - Push up the moving tray **(1)**.



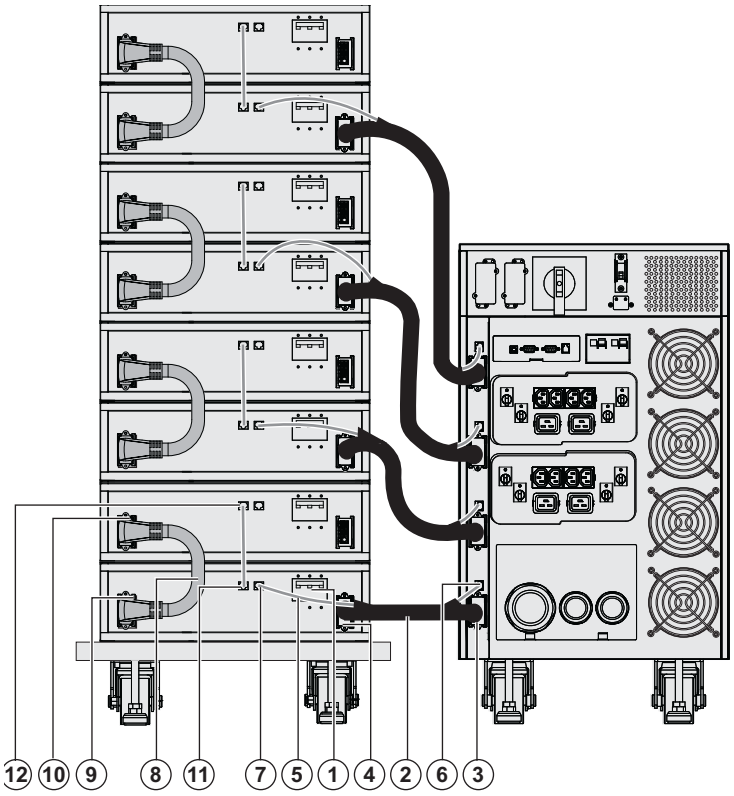
2 - Push in the moving tray **(1)**.



3 - Fix the 2 screws of the terminal block cover **(2)**.

Extended battery (EXB) connections

This type of connection must be carried out by qualified electrical personnel
It is not necessary to shutdown the UPS in order to install the extended battery (EXB) module.
Up to three batteries may be connected to each levels of the **MX Frame**.
The sequence below shows connection for two battery cabinets per level on a **MX Frame 20000 RT** model.



1 - Check that the battery circuit breaker **(1)** of each EXB is OFF ("0" position).

Start the following operations from the lowest level:

2 - Connect the battery cable **(2)** to the UPS battery power connector **(3)** and the other end of the battery cable to the EXB battery power connector **(4)**.

3 - Connect the battery detection cable **(5)** to the UPS battery detection connector **(6)** and the other end of the battery detection cable to the EXB battery detection connector **(7)**.

4 - Connect the inter-EXB battery cable **(8)** to the second EXB battery power connector **(9)** and the other end of the battery cable to the second EXB battery power connector **(10)** of the above EXB.

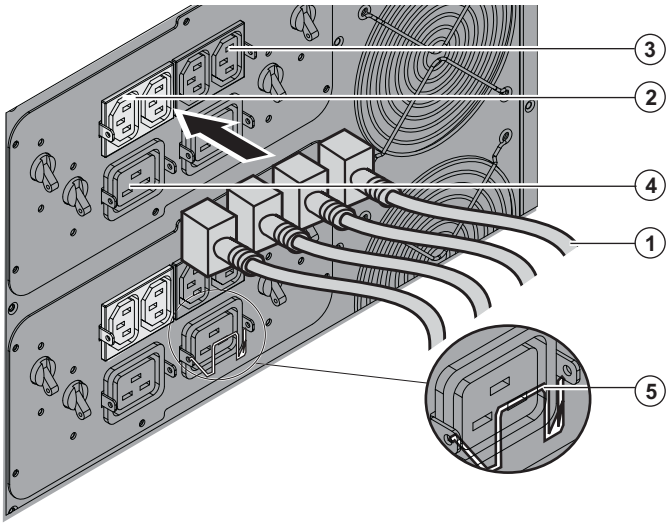
5 - Connect the battery detection cable to the second EXB battery detection connector **(11)** and the other end of the battery detection cable to the second EXB battery detection connector **(12)** of the above EXB.

6 - Repeat operations 2 to 5 to other levels

7 - Close the battery circuit breaker **(1)** of each EXB ("I" position).

Caution: a battery can cause electrocution and high short circuit currents.
Do not dispose of batteries in a fire. The battery may explode
Do no open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

Connection of IEC cables to output receptacles



1 - Connect the equipments to the UPS using the cables **(1)**.

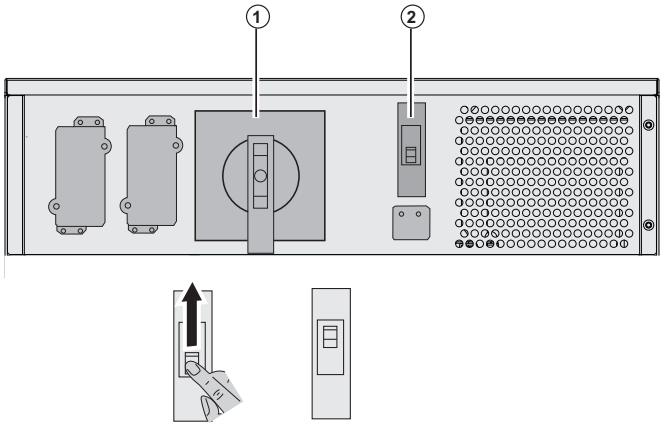
It is preferable to connect the priority equipments to the two outlets **(3)** and the non priority equipments to the two outlets **(2)** that can be programmed in pairs. Connect any high-power devices to the 16 A outlet **(4)**.
To program shutdown of outlets **(2)** during operation on battery power and thus optimise the available backup time, the EATON communication software is required.

2 - Fit the connection securing system **(5)** that prevents the plugs from being pulled out accidentally.

3. Operation

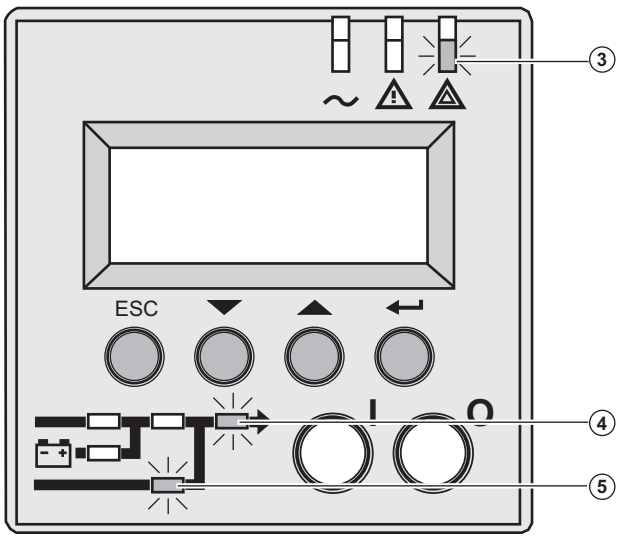
Initial start-up

It is essential to contact our Customer Service to ensure that your system is commissionned in complete safety and to benefit from the manufacturer's guarantee.



1 - Be sure that the manual bypass switch **(1)** is in normal position, like shown on the picture.

2 - Put the Normal AC source input switch **(2)** in "1" (ON) position



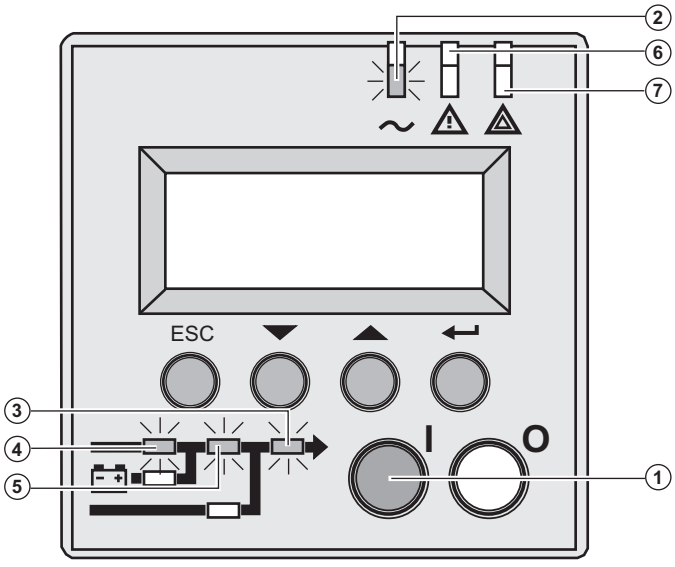
3 - Set the upstream circuit breaker (not included) to the "I" position (ON).

The equipments are powered via the Bypass AC source, but not protected by the UPS.

Batteries are recharging, an 8 hour recharge period is necessary to get full backup time.

LED **(3)** is ON, LEDs **(4)** and **(5)** are green.

Final start-up sequence



3- Press the "I" button **(1)** more than 3s.

The buzzer beeps once, and after UPS internal test sequence, the LED **(2)** is ON.

If internal test sequence fail, see chapter 7

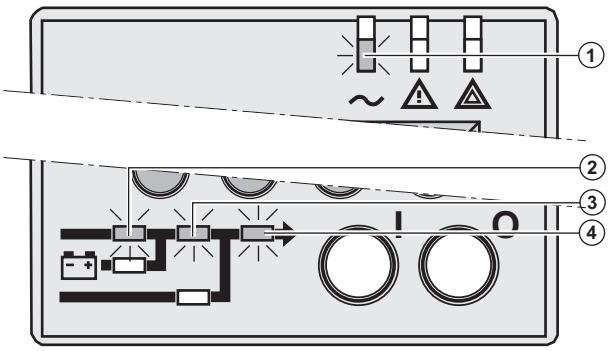
LEDs **(3), (4), (5)** are green.

The equipments are protected by the UPS.

If LED **(6)** or **(7)** is ON, an alarm has occurred (see the "troubleshooting" section).

Operating modes

Normal mode



This is the standard operating mode, set by default in the factory.

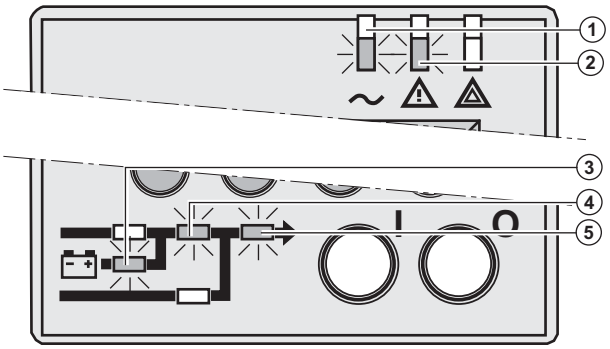
Under normal condition (Normal AC source available):
LED **(1)** is ON.
LEDs **(2), (3), (4)** are green.

The equipments are protected by the UPS.

Battery mode

When the Normal AC source is not available, the load continues to be protected by the UPS.
Power is supplied by the battery.

Transfer to battery power



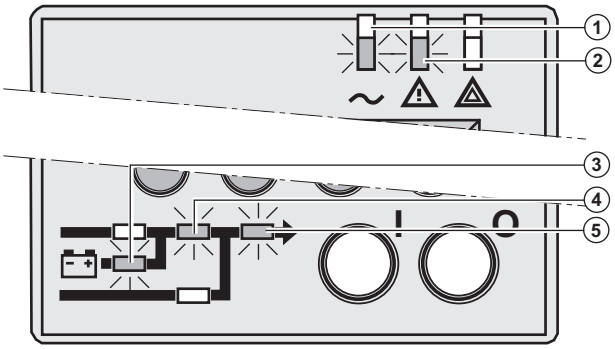
LEDs **(1), (2)** are ON.
LEDs **(3), (4), (5)** are green.

The audio alarm beeps every 10 seconds.

The equipments are protected by the UPS and supplied by the battery.

The display indicates the battery remaining backup time.

Low battery warning



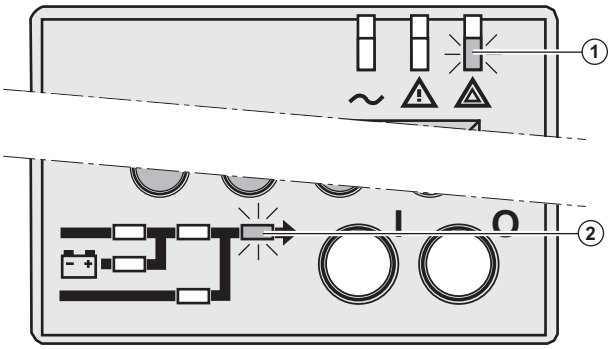
LEDs **(1), (2)** are ON.
LEDs **(3), (4), (5)** are green.

The audio alarm beeps every 3 seconds.

The remaining battery power is low.

Shut down all applications on the connected equipment because automatic UPS shutdown is imminent.

End of backup time



LED **(1)** is ON.
LED **(2)** is red.

The audio alarm beeps continuously.

The equipments are not powered.

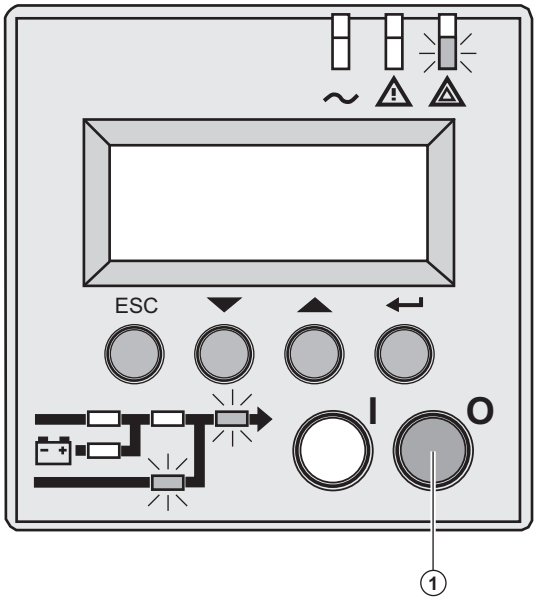
The UPS displays "End of backup time Battery low".

Return on Normal AC source

After an outage, the UPS restarts automatically when Normal AC source is restored (unless this function has been disabled via UPS personalisation) and the load is supplied again.

3. Operation

UPS shutdown



1 - Press the "0" button **(1)** more than 3s.

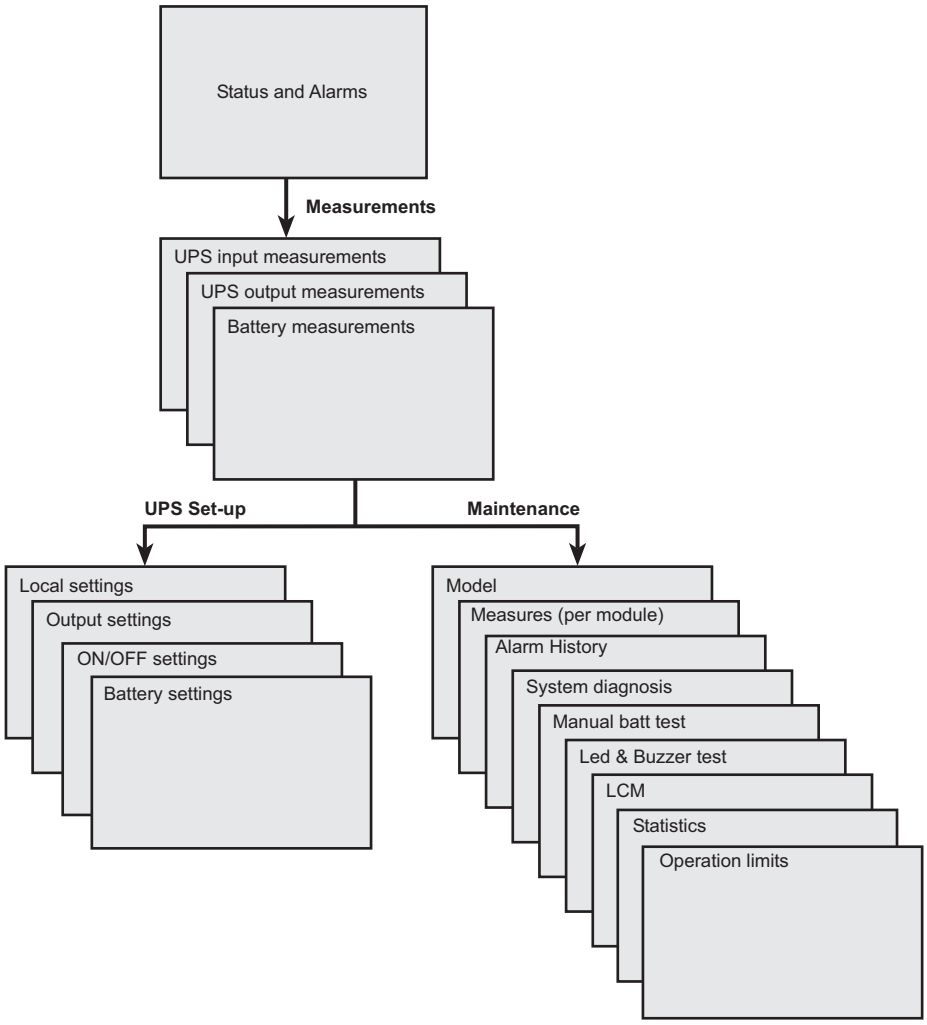
The buzzer beeps once, and the load is no longer protected by the UPS. It is powered via the Bypass AC source. If the UPS is set in frequency converter mode, the equipments will not be powered.

If the Normal AC source is out of tolerance, the UPS will generate a 10ms output calibrated break.

2 - For a full shutdown of UPS and connected load, the upstream circuit breaker (not included) should be set to the "0" position.

4. Access to measurements and personalisation data

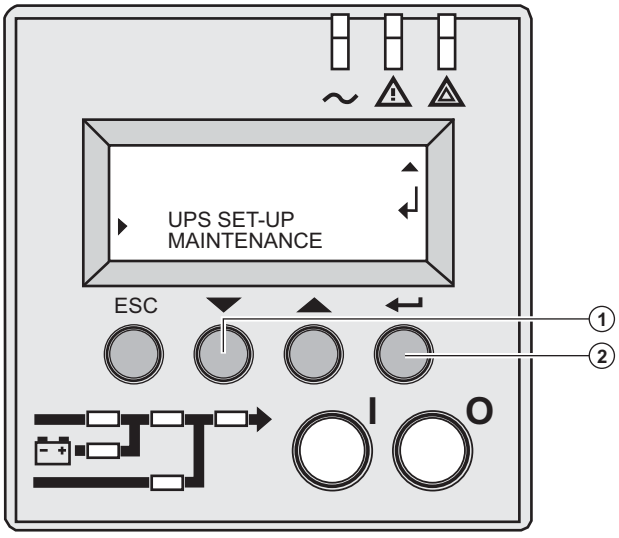
Display organisation



Access to measurements

Press the scroll button (see section 1.5, page 10) to access measurements for voltage, current, frequency, power output and battery capacity.

Access to UPS set-up and maintenance



- Press the scroll button **(1)** a number of times to point the **UPS set-up** or **Maintenance** menu
- Press the Enter button **(2)** to get access.

4. Access to measurements and personalisation data

UPS set-up

Local settings

Function	Factory setting	Options
Language	English	French, German, Italian, Portuguese, Spanish
Date / Time Format	International (DD-MM-YYYY/HH :MM)	US (MM-DD-YYYY/HH:MM AM/PM)
Date / Time Change	GMT + 1 (Continental Europe)	MM-DD-YYYY/HH :MM adjustable
Audible Alarm	Yes	No

Output settings

Function	Factory setting	Options	Comments
Output Voltage	230 V	200 V / 208 V / 220 V / 240 V / 250 V	
Freq Converter	Disable	Enable	
Output Frequency	50 Hz	60 Hz	User selectable under frequency-converter mode
Bypass Transfer	Yes	No	Transfer to bypass if Normal AC source is out of tolerance
Interrupt Time	10 ms	20 ms, ... , 200 ms	Break time calibration during load transfer on Normal AC source out of tolerance
Overload Prealarm	105 %	40 %, 50 %, 70 %	Alarm if threshold is overrun
Redundancy Mode	No	Yes	Alarm if redundancy loss
Redundancy Level	1	2,3	On redundancy Mode:number of redundant modules needed

ON/OFF settings

Function	Factory setting	Options	Comments
Cold Start	Disable	Enable	Start on battery
Forced Reboot	Enable	Disable	Enables automatic restart of the system even if Normal AC source is restored before the end of the shutdown sequence
Auto Restart	Enable	Disable	UPS restarts automatically when Normal AC source is restored
Energy Saving	Disable	Enable	Automatic shutdown on battery if output load level < 10 %
Sleep Mode	Enable	Disable	
Remote Command	Enable	Disable	Enables consideration of shutdown or restart orders from software to be authorised

Battery settings

Function	Factory setting	Options	Comments
Auto Battery Test	Everyweek	No test / everyday / everyweek /everymonth	
Low Batt Warning	20%	0 to 100%	1% increment
User Batt Settings	UPS reads number of battery modules connected	From 0 to 40 Ah	5 Ah increment
Deep Disch Protect	Yes	No	Protection against deep discharge. If disable, EATON warranty will be void

Maintenance

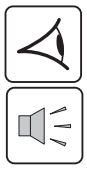
Function	Sub-Function	Option / Display	Comments
Model	Power Module	SN: xxxxxxxxx SOFT: xxx NT: xxx	Serial number Soft version Technical level
	Frame		
Measurement	Monitoring by selecting modules 1 trough 4	Status for each module: Input/Output kVA to load Battery capacity	
Alarm History	Read	Description Date Hour Alarm xxx	10 alarms can be stored automatically
	Erase	No / Yes	
System Diagnosis	Module detection	Status for each module	
Manual Batt Test	Manual Battery Test	No / Yes	
Led & Buzzer Test	Led & Buzzer Test	No / Yes	
Life Cycle Monitoring	LCM	Enable / Disable	Life cycling monitoring alarms
Statistics	Auto Statistics	Statistics	
	Custom Statistics	Reset Date ? Are you sure ?	
Operation Limits	Operation Limits		Automatic alarms displayed when UPS is operating near the limits

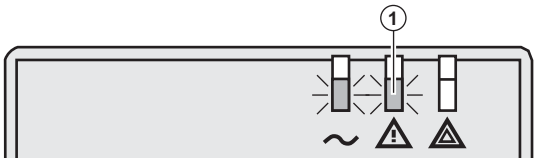
Personalisation using external software

◗ Insert the **Solution-Pac** CD-ROM in the drive.
◗ On the first navigation screen, select "Point to Point solution" and follow the instructions on how to install the **Personal Solution-Pac** software.
◗ Then select "Settings", "Advanced settings" and "UPS settings".
Note that only the Windows versions of the **Personal Solution-Pac** software offer this possibility.

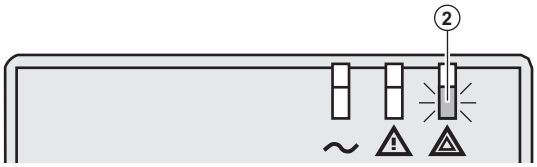
5. Troubleshooting

Troubleshooting LEDs

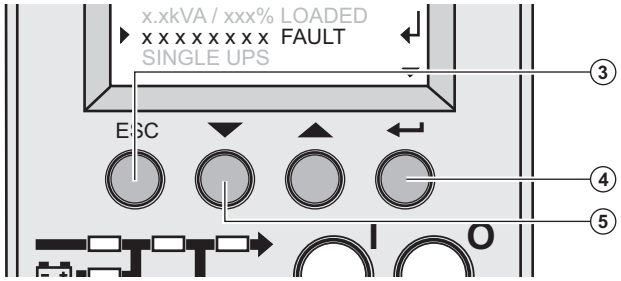




If LED **(1)** is ON:
the equipments are protected by the UPS but the operation is downgraded.

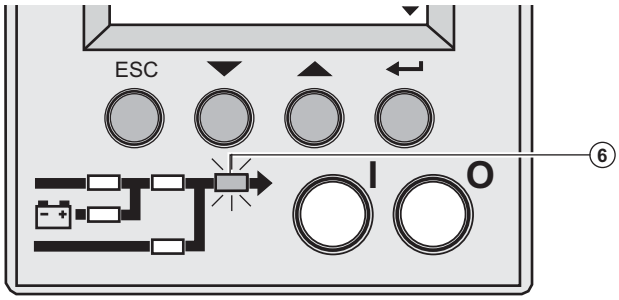


If LED **(2)** is ON:
the equipments are no longer protected by the UPS.



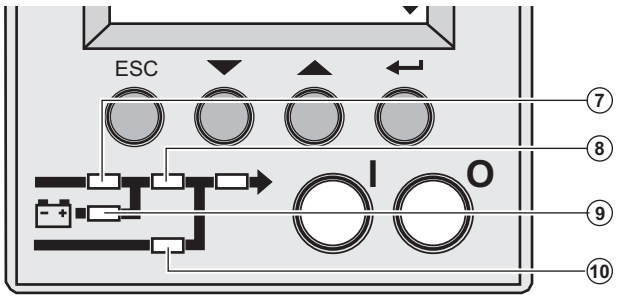
Press the escape button **(3)** to stop the audible alarm.

Note :
In case of "MULTIPLE FAULT", press the "Enter" button **(4)** and the scroll button **(5)** to get access to further details.
In case of "LCM WARNING", refer to LCM section (see section 6, page 38).



if LED **(6)** is ON:
The equipments are no longer supplied.

Follow the displayed instructions.



if one of the following LEDs is ON

Rectifier LED **(7)**
Inverter LED **(8)**
Battery LED **(9)**
Bypass LED **(10)**

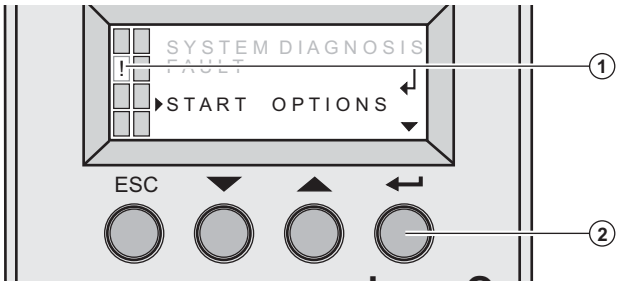
One of the main UPS function has faulted.

Follow the displayed instructions.

System diagnosis fault

A internal sub-module fault is detected

..



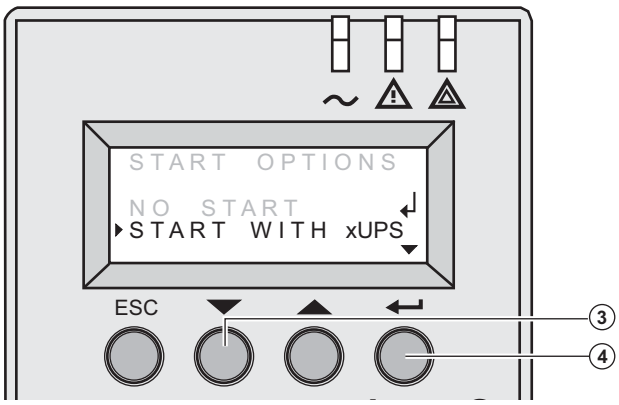
A internal power sub-module **(1)** fault is detected.

Press the "Enter" button **(2)**.

Choose one of the two sequences below:

Start with xUPS

You can even run the UPS with a reduced power rate



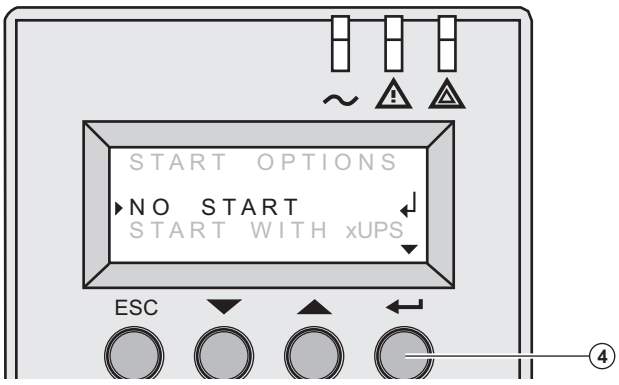
Press the scroll button **(3)**.

Press the "Enter" button **(4)**.

Check power or battery sub-module connections (see section 7, page 39).

If the connections are correct, call the after-sales support department and follow the sub-module replacement procedure (see section 7, page 39).

No start



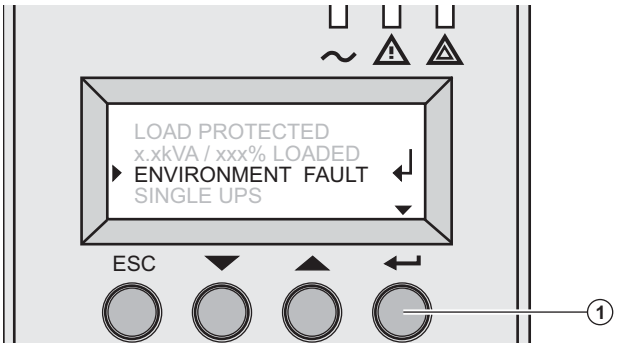
Press the "Enter" button **(4)**.

Check power or battery sub-module connections (see section 7, page 39).

If the connections are correct, call the after-sales support department and follow the sub-module replacement procedure (see section 7, page 39).

5. Troubleshooting

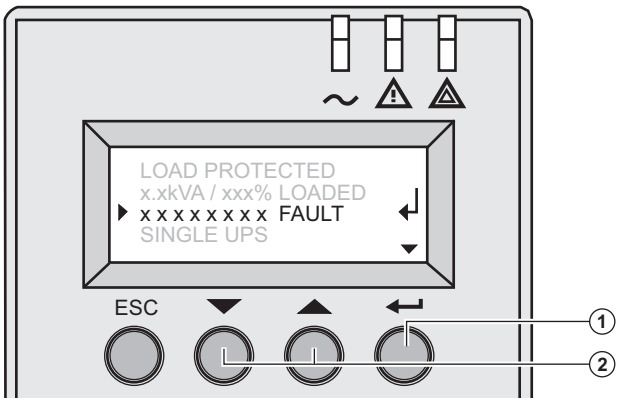
Environment faults



Press the "Enter" button **(1)** to display the details below :

Displayed details	Signification	Correction
≠ BATTERY Ah	The number of detected batteries of a level is low compared to the other levels.	Check the external battery connection (detection cable and power cable) see section 2.3 page 27 Or Put the same number of EXB for each level, see see section 2.3 page 27
BYPASS AC FREQ/VOLT NOK	The Bypass AC source is out of tolerance.	Check the Bypass AC source voltage or frequency.
I/O BAD CONNECTION	AC source is not connected to the correct terminals	Check AC wiring, see section 2.1 page 23
INV THERM OVERLOAD	The UPS shuts down automatically because of a major overload.	Check the power drawn by the connected devices and disconnect any non-priority devices.
INVERT LIMITATION	Short circuit conditions on output devices	Check the installation at the UPS output (wiring, fault equipment).
NO BATTERY	The battery is incorrectly connected, or no battery is detected.	Check battery connections, see section 2.3 page 27 Or Insert the missing batteries sub-modules, see section 1.9 page 15
NO BATTERY MODULE	No battery sub-module is detected next to an inserted power sub-module.	Check battery sub-module connections, see section 7.2
NO MODULE	No module is detected on the first (lowest) level.	Check the module detection, see section 1.9 page 15 Or Insert the missing sub-modules.
NO POWER MODULE	No power sub-module is detected next to an inserted battery sub-module.	Check power sub-module connections, see section 1.9 page 15
NORMAL AC FREQ/ VOLT NOK	The Normal AC source is out of tolerance	Check the Normal AC source voltage or frequency.
OUTPUT OVERLOAD	The UPS is on overload and will shut down automatically	Check the power drawn by the connected devices and disconnect any non-priority devices.
POWER MODULE NOT COMPATIBLE	The power sub-module inserted is not compatible.	Check if the power rate of the power sub-module is 5 kVA.
SOFT FRAME POWER NOT COMPATIBLE	The software of the power sub-module is not compatible with the **Mx Frame** software	Upgrade the UPS software via **www.eaton.com**

Internal faults



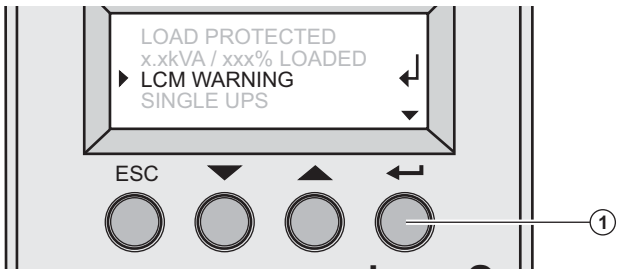
Display	Signification	Correction
POWER MODULE FAULT	Internal power sub-module fault detected. Use "Enter" button **(1)** to display details.	Call the after-sales support department. Follow the power sub-module replacement procedure (see section 7.1 page 39)
BATT MODULE FAULT	Battery fault detected during the battery test. Use "Enter" button **(1)** to display details.	Call the after-sales support department. Follow the battery sub-module replacement procedure (see section 7.2 page 39)
FRAME FAULT	Internal chassis fault detected. Use"Enter" button **(1)** to display details.	Call the after-sales support department. Follow the frame replacement procedure (see sections 7.1, 7.2 page 39)

Note: In case of multiple fault, press the "Enter" button **(1)** and the scroll buttons **(2)** to get access to further details.

6. Life Cycle Monitoring (LCM)

Description

This function, embedded in the UPS, displays messages, on screen and communication channels, at every important stage of the UPS's life, allowing you to:



Press the "Enter" button **(1)** to display LCM warning details.

Secure your installation power continuity

Anticipate maintenance actions thanks to automatically displayed warnings while displaying automatic warnings when maintenance actions need to be planned :

LCM warning details	Signification
BATTERY CHECK RECOMMENDED CONTACT EATON AT www.eaton.com	Battery is approaching its reliability end of life. Risk to reduce dramatically backup time

Reset or disable LCM

In case of any LCM messages displayed:

- For temporary reset: press the escape button more than 3 seconds, into Status and Alarm screen, to cancel temporary the alarm status.
The alert will be repeated twice each 30 days.
- For permanent reset: press the enter button more than 3 seconds, into LCM warning screen, to cancel permanently this LCM event.

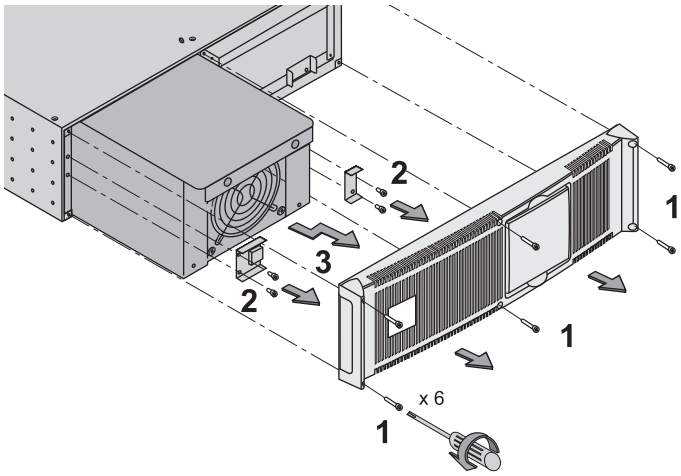
At any time:
To Disable all LCM messages select "disable all" ,into LCM menu.
Be careful: you will not be aware of any LCM events that can happen on the UPS if you disable all LCM messages.

Hot swapping the power sub-module

This operation must be carried out by qualified electrical personnel only.

This operation can be performed without interrupting the equipments.

Disconnecting the power sub-module :



1 - Remove the 6 fixing screws to free the main front panel bezel.
2 - Remove the 4 fixing screws on the left side to free the power sub-module.
3 - Withdraw the power sub-module.

Reconnecting the power sub-module :

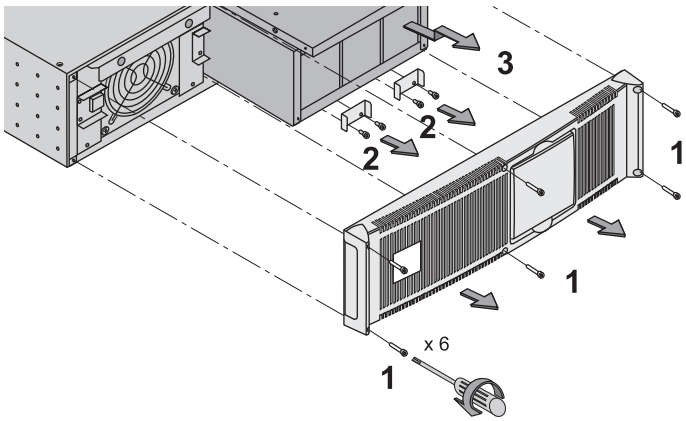
- Carry out the above instructions in reverse order.
- Replace the faulty power sub-module by another one with same power rating.

Hot swapping the battery sub-module

- **Caution: a battery can cause electrocution and high short circuit currents.**
  Do not dispose of batteries in a fire. The battery may explode
  Do no open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- **Servicing of batteries should be performed or supervised by personel knowledgeable of batteries and the required precautions. Keep unauthorized personel away from batteries.**
- **Remove watches, rings, bracelets and all other metal objects from the hands and arms,**
- **Use tools with an insulated handle.**
- **When replacing batteries, replace with the same number of the BB/HR5.5-12 batteries.**

This operation can be performed without interrupting the equipments.

Disconnecting the battery sub-module :



1 - Remove the 6 fixing screws to free the main front panel bezel.
2 - Remove the 4 fixing screws on the right side to free the battery sub-module.
3 - Pull the battery sub-module slightly, then lift it to extract it.

Reconnecting the battery sub-module :

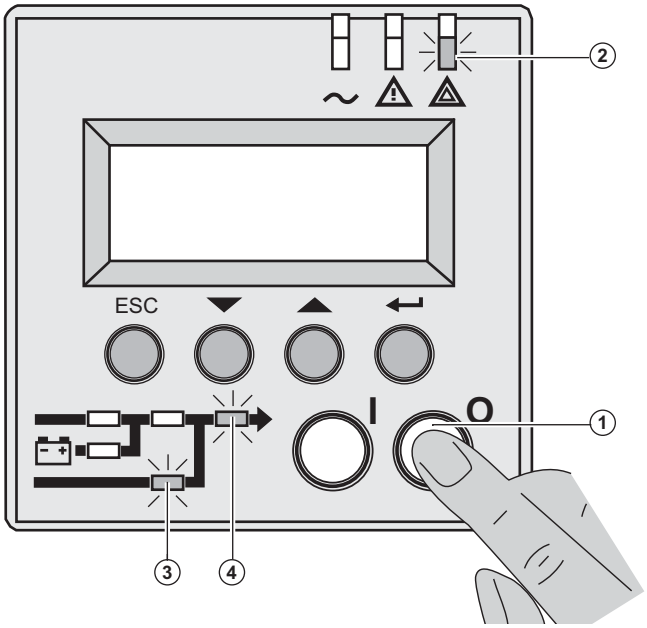
Carry out the above instructions in reverse order.

- **To ensure safety and high performance, use only batteries supplied by EATON.**

7. Maintenance

Service position (bypass position)

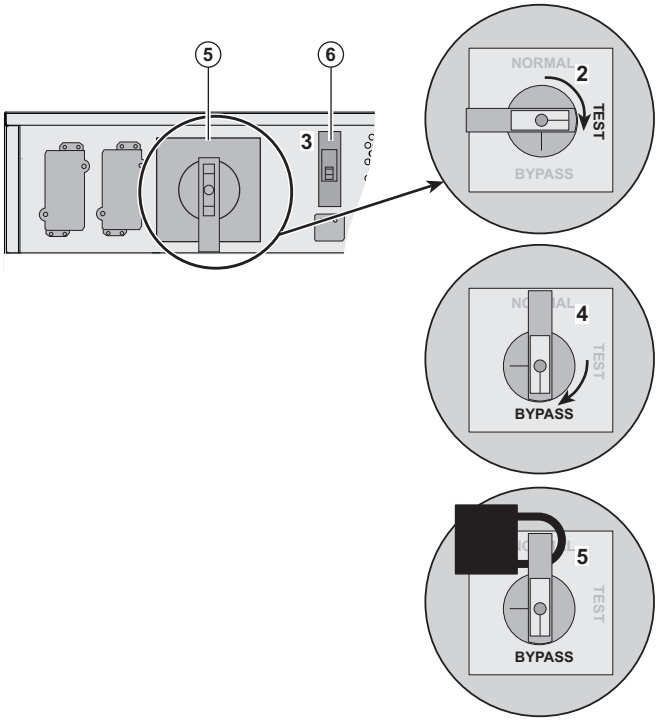
This operation must be carried out by qualified electrical personnel only.
The equipments should be powered via the Normal AC source, and not protected by the UPS.



1 - Press and hold the (0) (OFF) button **(1)** for 3 seconds/

The load is powered via the Bypass AC source (bypass mode).

LED **(2)** is ON, LEds **(3)**, **(4)** are green



2 - Unlock the Manual Bypass switch **(5)** and set to the test position.

3 - Turn off the Normal AC source circuit switch **(6)**.

All LEDs on the front display are off.

4 - Set the Manual Bypass switch **(5)** to bypass position.

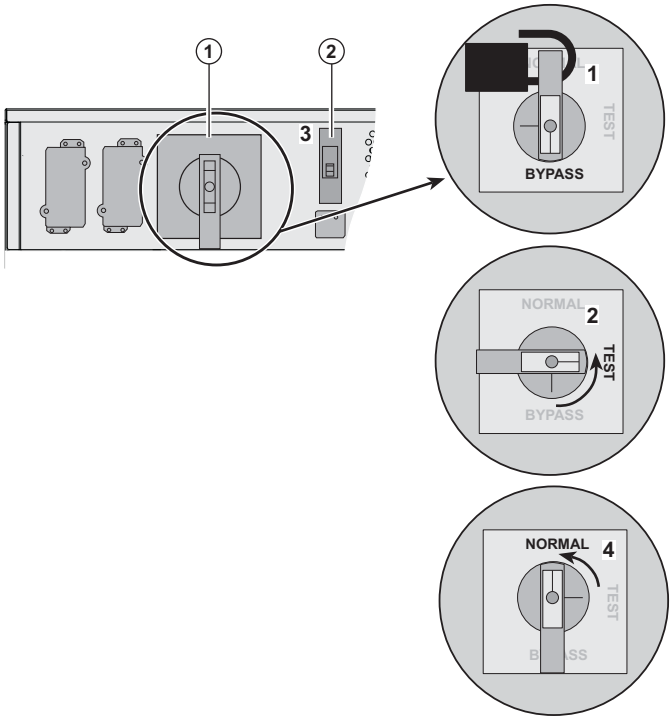
5 - Pull red padlock in the center of the manual bypass switch **(5)** to lock into bypass position.

6 - Remove all the battery sub-modules, see section 7.2, page 39.

The MX Frame is now ready for service.

Normal position (online mode)

This operation must be carried out by qualified electrical personnel only.
Return to normal position from service position (bypass position).



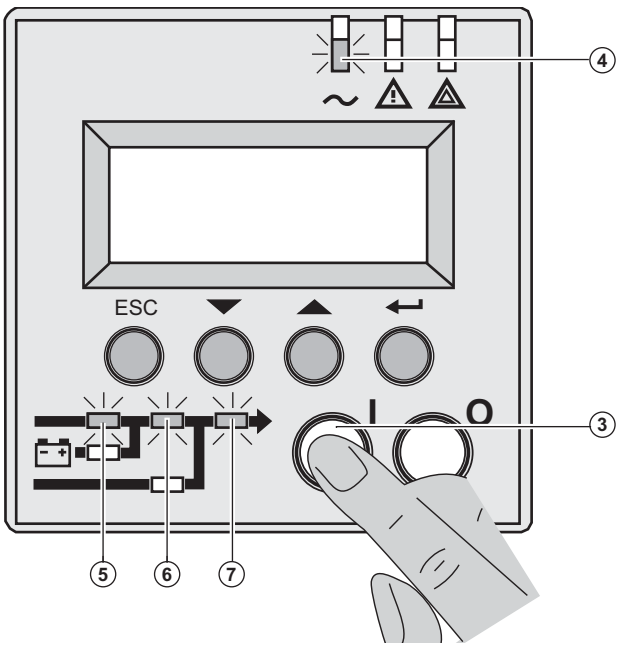
1 - Push the red padlock in the center of the manual bypass switch **(1)** to unlock it

2 - Set the bypass switch **(1)** to test position.

Wait 3 seconds.

3 - Turn on the Normal AC source input switch **(2)**.

4 - Set the bypass switch **(1)** to normal position.



5 - Press and hold the (I) (ON) button **(3)** for 3 seconds.

MX Frame performs an internal test sequence.

LED **(4)** is ON, LEDs **(5), (6), (7)** are green.

The load is protected

7. Maintenance

Training centre

To fully master operation of your EATON product and carry out level 1 servicing, see our complete range of technical training courses, available in both French and English.

For further information, please visit our website: www.eaton.com

Technical specifications

	MX Frame 15000 RT	MX Frame 20000 RT	MX EXB
Output power	15 kVA (1) / 13.5 kW (2)	20 kVA (1) / 18 kW (2)	
Electrical supply network ◗Rated input voltage ◗Input voltage range ◗Frequency ◗Power factor Harmonic distortion ◗Leakage current	Single phase 230 V / Three phase 400 V 120 / 156 V to 280 V (3) 50/60 Hz (autoselection) > 0,99 > 5% 1:1 20 mA max. / 3:1 30 mA max.		
Load output ◗Voltage ◗Frequency ◗Harmonic distortion ◗Overload capacity	Single phase 230 V ±3% (4) 50/60 Hz ±0,5% (5) 1:1 < 10% / 3:1 < 20% 105% continuous, 110% 2min, 125% 1min, > 150% 0.5s		
Battery	15 x 12V - 5 Ah, sealed lead acid, maintenance free	15 x 12V - 5 Ah, sealed lead acid, maintenance free	Two 15 x 12 V - 5 Ah strings, sealed lead acid, maintenance free
Environment ◗Operating temperature range ◗Relative humidity ◗Storage temperature range ◗Altitude	0°C to 40°C 20% to 90% (non-condensing) -25°C to 40°C 0 to 1000 m without derating		
◗Noise level	< 51 dBA		

(1) If the output voltage is 200V - 250V, the output power is 15 kVA / 12 kW.
(2) With one **EXB** module or more, the standard output power is 20 kVA / 16 kW.
(3) Values for 70% / 100% of UPS output.
(4) Programmable: 200V / 208V / 220V / **230V** / 240V / 250V using the **UPS Config** software.
(5) Frequency-converter mode is programmable using the **UPS Config** software.

8. Appendices

Glossary

Backup time	Time that the connected equipments can operate on battery power.
Bypass AC source	Source supplying the bypass line. The equipments can be transferred to the bypass line if an overload occurs on the UPS output, for maintenance or in the event of a malfunction.
Equipments	Devices or systems connected to the UPS output.
Frequency converter	Operating mode used to convert the AC-power frequency between the UPS input and output (50 Hz -> 60 Hz or 60 Hz -> 50 Hz).
Low-battery warning	This is a battery-voltage level indicating that battery power is low and that the user must take action in light of the imminent break in the supply of power to the load.
Manual bypass	Rotary switch controlled by the user, used to connect the equipments directly to the AC source. Transfer of the equipments to the manual bypass enables UPS maintenance without interrupting the supply of power to the connected equipments.
Normal AC source	Normal source of power for the UPS.
Normal (double conversion) mode	The normal UPS operating mode in which the AC source supplies the UPS which in turn supplies the connected equipments (after electronic double conversion).
Personalisation	It is possible to modify certain UPS parameters set in the factory. Certain UPS functions can also be modified by the **EATON** power management products to better suit user needs.
Programmable outlets	These outlets can be automatically shut down during operation on battery power (shutdown time delays can be programmed with the **EATON** power management products). The UPS has two sets of two programmable outlets.
Relay contacts	Contacts supplying information to the user in forme of signals.
UPS	Uninterruptible Power System.

Nous vous remercions d'avoir choisi un produit EATON pour la sécurité de vos applications.

La gamme **MX** a été élaborée avec le plus grand soin.
Pour exploiter au mieux les performances de votre **ASI** (**A**limentation **S**ans **I**nterruption), nous vous conseillons de prendre le temps de lire ce manuel

Attention : Cette ASI est un produit de classe A. Dans un environnement domestique, ce produit peut causer des interférences radio, et dans ce cas, l'utilisateur pourra être amené à prendre des mesures complémentaires.
Les câbles de sortie ne doivent pas dépasser 10 m de longueur.
Si ce produit doit être installé dans un environnement de surtensions de catégorie III ou IV, une protection anti-surtensions amont devra être prévue.

Avant l'installation de **MX**, lire le livret qui présente les consignes de sécurité à respecter. Suivre ensuite les instructions du présent manuel.

Nous vous invitons à découvrir l'offre EATON ainsi que les options de la gamme **MX** en visitant notre site WEB : www.eaton.com, ou en contactant votre représentant EATON.

Respect de l'environnement

La société EATON s'est engagée dans une politique de protection et de préservation de l'environnement.
Nos produits sont développés selon une démarche d'éco-conception.

Substances

Ce produit ne contient ni de CFC, ni de HCFC, ni d'amiante.

Emballage

Pour améliorer le traitement des déchets et faciliter le recyclage, séparer les éléments de l'emballage.
- Le carton est composé de plus de 50 % de carton recyclé.
- Les sacs et sachets sont en polyéthylène.
- Les matériaux constituant l'emballage sont recyclables et marqués du symbole d'identification

.

Matériaux	Abréviation	Numéro dans le symbole
Polyéthylène Téraphthalate	PET	01
Polyéthylène Haute Densité	HDPE	02
Polyvinyle Chloride	PVC	03
Polyéthylène Basse Densité	LDPE	04
Polypropylène	PP	05
Polystyrène	PS	06

Suivre les réglementations locales en vigueur pour l'élimination de l'emballage.

Fin de vie

La société EATON s'est engagée à traiter les produits en fin de vie selon les réglementations locales.
EATON travaille avec des sociétés en charge de la collecte et de l'élimination de nos produits en fin de vie.

- **Produit**

Le produit est composé de matériaux recyclables.
Son démantèlement et sa destruction doivent se faire en accord avec les réglementations locales en vigueur concernant les déchets.
Le produit en fin de vie doit être déposé dans un centre de traitement des déchets électriques et électroniques.

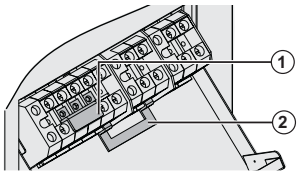
- **Batterie**

Le produit contient des batteries au plomb qui doivent être traitées suivant les réglementations locales en vigueur concernant les batteries.
Pour suivre ces réglementations et éliminer la batterie de manière propre, il est possible de l'extraire du produit.

Ingresso trifase

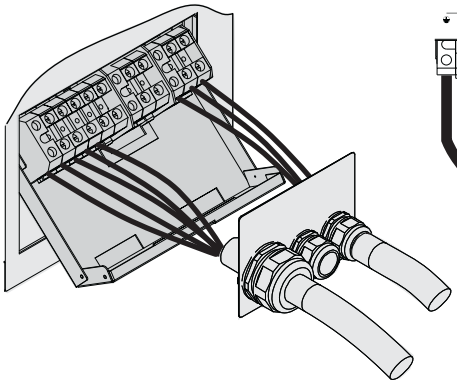
Questo tipo di collegamento deve essere effettuato da elettricisti qualificati

Alimentazioni comuni



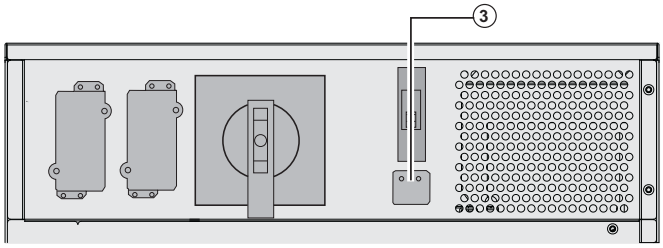
1 - Rimuovere la piattina metallica monofase (1)

2 - Accertarsi che il ponticello metallico (2) sia installato



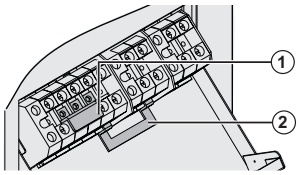
3 - Collegare i 5 cavi al blocco terminale dell'alimentazione AC Normale

4 - Collegare i 3 fili al blocco terminale in uscita



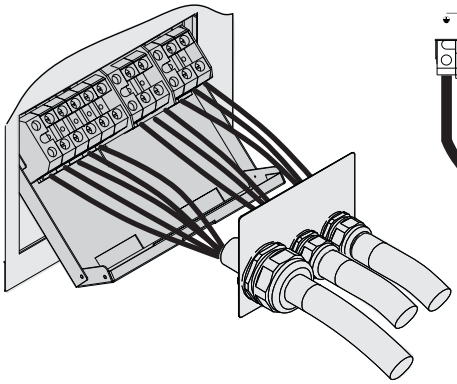
5 - Rimuovere il coperchio e posizionare il selettore di ingresso **(3)** su trifase.

Alimentazioni separate



1 - Rimuovere la piattina metallica monofase (1)

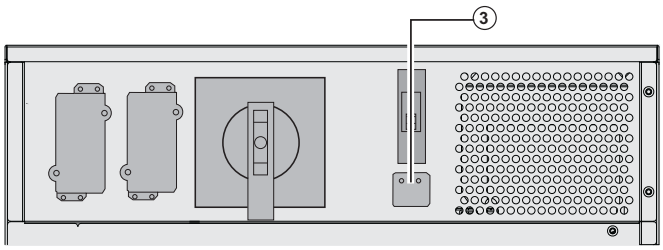
2 - Rimuovere il ponticello metallico (2)



3 - Collegare i 5 cavi al blocco terminale dell'alimentazione AC Normale

4 - Collegare i 3 cavi al blocco terminale dell'alimentazione AC Bypass

5 - Collegare i 3 fili al blocco terminale in uscita



5 - Rimuovere il coperchio e posizionare il selettore di commutazione monofase o trifase **(3)** su trifase.